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PURE PC POWER

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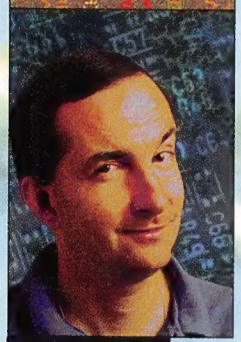
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boot

october 1996

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EDITOR'S WORDS

The difference between "Dreamy" and "Kick Ass"

Last month, when we were putting together the premiere issue of *boot*, I had a conversation with reviews editor Michael Brown that had larger ramifications than expected.

It was over dinner and I was questioning the rating he had given a particular system. I won't reveal which system it was (other than to say it is the PC—albeit mildly camouflaged—that appeared on the front cover of the issue). Anyway, I knew that the machine had become a favorite in the bootLab for testing cards, benchmarking peripherals, and just general use. When it first came in, we didn't anticipate its popularity. The numbers were respectable: 166MHz, 2.5GB hard disk, 16MB EDO DRAM, four full-length PCI slots, three full-length ISA slots. All very solid.

But where it excelled was in the categories that weren't so easily quantifiable. The spacious case made installing upgrades a breeze (which, given life in the bootLab, is a major plus). In general, it proved to be a reliable machine with the power to serve.

In my dinner conversation with Mike about the rating we had given the 166MHz system—we gave the machine our highest rating, "Dreamy" (90 to 100 percent), but toward the bottom of that range and no "Kick-Ass" award—he explained that the rating given was factored in with the class of machine we were dealing with. In the same issue, we had a feature that spotlighted a new generation of machines: 200MHz systems with all the whistles and bells, including dual on-board 3D acceleration. These were exclusives, and we were the first to get hands-on and dirty with them, so we had a unique glimpse of the near future. Mike explained that, compared to these 200MHz monsters, that sturdy vanilla 166MHz came up short.

Granted, we need to give ourselves some room to grow into. The problem is that the 166MHz system is one of the best available today and deserves recognition as such. But the phenomenally fast evolution of high-end home systems pumps out bigger and better gear before any magazine can even get to press. By the time you read this, the Compaq 8710 should be on store shelves.

We review products to inform you about the specs and the details that go beyond the spec sheet. We know you want to own the best, and we want to point you toward a perfect fit for your particular wants and needs. If you're reading this magazine, we have a pretty good idea that you want Pure PC Power (to coin a phrase). But the nature of that power is flexible and perhaps harder to define than ever before in the history of personal computing. Maybe 3D accelerators matter to you. Maybe they don't. Maybe MMX matters to you. Maybe you'll wait until Merced.

The thing is: The hard-core home user is demanding and wants the best. But the best is always just around the corner. "Just wait until the next generation," is the motto. But we are also users. We need a machine now. We aren't looking for a status symbol or an investment. What can I get today? *boot* will review products under these assumptions. We will employ a sliding scale based on the caliber of gear available today and take into account the newcomers that appear on our advance radar of the scene.

Ultimately, the goal is to give you the most useful magazine possible. And part of that requires your feedback. Should we factor in near-future products when reviewing gear? Should we reserve the "Kick Ass" tag for products that excel in the intangibles? Should we start getting super models to pose for our covers? Drop me a line at: editor@bootnet.com, and let's get busy.

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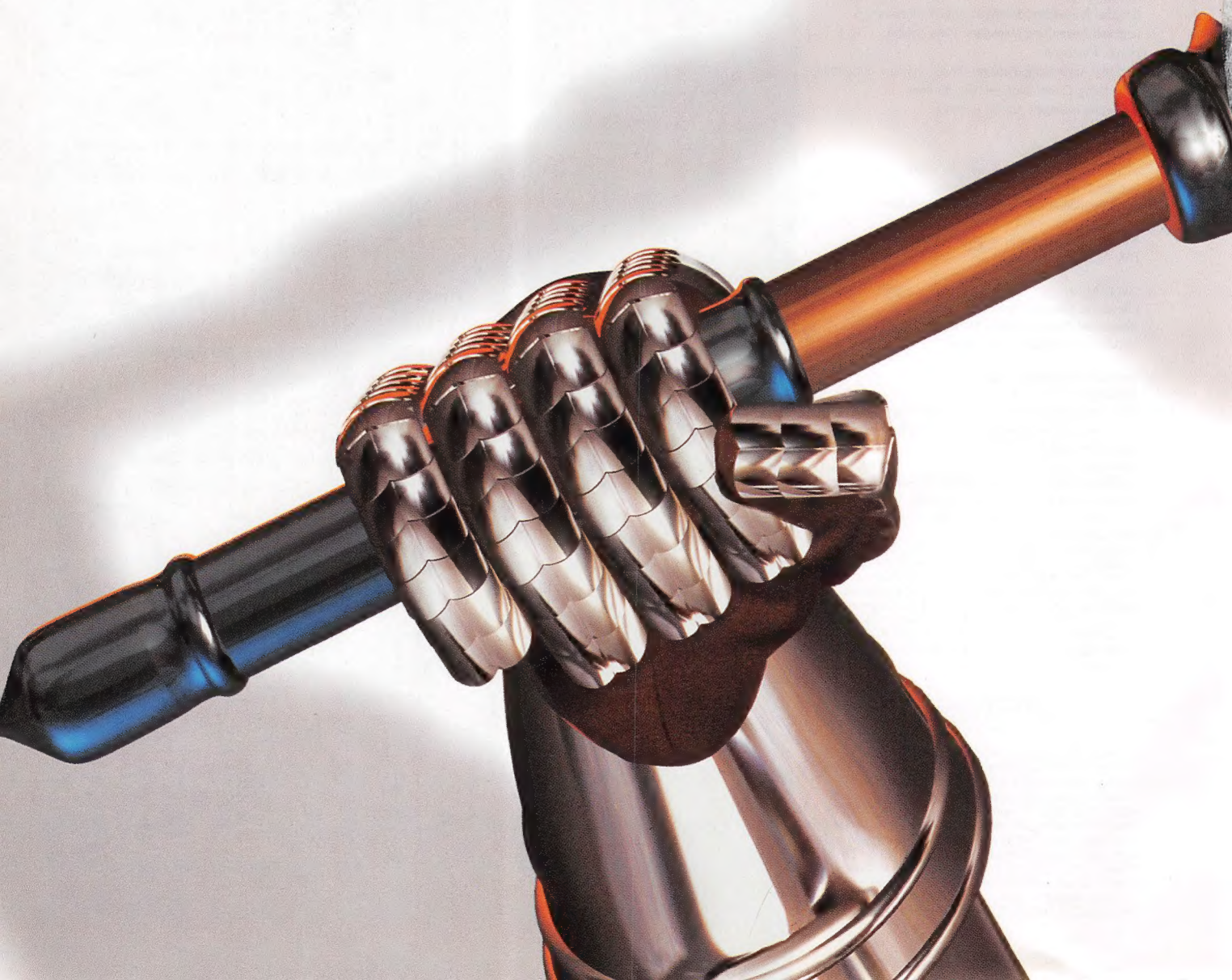

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We miss it, too

Last Christmas, my well-meaning, but basically clueless, mother gave me a subscription to *CD-ROM Today*. Woo-hoo. Not my cup of Jolt if you catch my drift. I write device drivers in assembly and think it's the most fun job imaginable. I have an Altair that I still goof around with. And I think writing fractal generators in FORTRAN, to be displayed with text graphics, is a good intellectual enterprise. (And I have a girlfriend—go figure.)

Anyway, I think I have about six shrink-wrapped copies of *CDRT* still sitting in my hall. The writing was pretty good, but the content: Snore. I *do not* care about the latest furry soft edutainment title. I do however, salivate when it comes to (borrowing from you) "Pure PC Power." It could have been somewhat more hard-core, but I totally approved of your power supply choice for the build-your-own-PC article. Anyway, you're off to a good start. Whatever. I gotta call my mom and tell her to renew me for next year.

Eddie Hammerbeck
Boston, MA

Edge? Isn't that a brit magazine?

I like your magazine. It has an edge I haven't seen since *Wired* was launched, and just a hint of attitude. I really liked the nice blend of articles, and the Windows NT 4.0 review was right on the money. Most of all, I appreciated the coverage of 3D accelerators, even though the screen shots were a might small (until I slid them under my tabletop electron microscope, of course, then the textures jumped right off the page!). It would be nice to see more about these cards, with some real numbers and side-by-side screen shots for a great comparison.

Lee Lorenz
via Internet

Thanks Lee! Check out the previews of the latest 3D chipsets (page 66-67) and reviews of the Matrox Mystique, ATI Rage, Orchid Fahrenheit, and Number Nine 9FX Reality 332 (page78-79) in this issue. Next month we really do 3D accelerators right with the bootWorthy rundown of the best hardware/software out there—complete with big screen shots!

Matrox owner speaks out

I think you guys have a great opportunity to fill a badly needed gap in the computer magazine market with the format and content of your new magazine. Congratulations on a good, and timely, magazine.

However, there was an error in the content of the $5k PC article about the Matrox Millenium. I own one of these babies, and I can assure you this card cannot do hardware-based texture mapping. It does have some other 3D functionality, including Z-buffering and Gouraud shading. Unfortunately, texture mapping is exactly what is needed for high performance gaming in 3D. This card is still the best all-around video card out there IMHO, and absolutely flies in Windows 95 and Windows NT, as well as giving excellent full-screen MPEG and AVI video clip performance, all done at very high resolutions and refresh rates.

Jim Stingily
via Internet

Good catch Jim, thanks for pointing that out. The Millennium cant do perspective-corrected texture mapping—that's why Matrox introduced their new Mystique accelerator, which we were thinking of when that passed through our edit.

NEC on the record

Thank you for including the NEC PowerPlayer gamer PC in the August/September 1996 Hands-On Review section. We at the NEC division of Packard Bell NEC believe *boot* will be a very influential and important magazine for the power user.

To maintain the accuracy of your publication, however, I want to point out a grave misunderstanding in the quote attributed to Bret Kennedy, NEC product manager, "The 3Dfx Voodoo is number one, ATI's 3D Rage is number two, and the PowerVR is number three or four."

First of all, this statement does not represent Mr. Kennedy's viewpoint. Second, it does not accurately reflect the reasons for NEC choosing to use 3Dfx products over the Video PowerVR graphics accelerator.

To set the record straight, NEC considers both graphics accelerators to be leaders in the same class. However, due to product availability and price/performance issues at the time we made our choice, we felt that 3Dfx was the appropriate choice.

The 3D graphics market is still emerging. We will continue to evaluate the best available graphics solutions and provide the best choice for our customers.

Michael DeNeffe
Director of Marketing at NEC

Reviews Editor Michael Brown responds: We should point out that our coverage of the PowerPlayer 2010 (and the Compaq Presario 8710) consisted of ▶ 10

THE bootSURVEY

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1. First, tell us a little about yourself. Please check the appropriate box for your age...

- ☐ Under 21
- ☐ 21 to 30
- ☐ 31 to 40
- ☐ 41 to 50
- ☐ 51 or over

2. ...And gender:

- ☐ Male
- ☐ Female

3. As a computer user, how would you describe yourself?

- ☐ Novice
- ☐ Intermediate
- ☐ Advanced
- ☐ Power User

4. Rank the following sections of *boot* in order of interest (1 = lowest interest, 5 = highest interest).

Columns	1	2	3	4	5
Features	1	2	3	4	5
Lip	1	2	3	4	5
Previews	1	2	3	4	5
Reviews	1	2	3	4	5
12 Step	1	2	3	4	5
bootWire	1	2	3	4	5
Nuggets	1	2	3	4	5

continued next page...

Ten (10) different software titles, selected by the *boot* editors, will be awarded to ten (10) respondents chosen in a random drawing from all qualifying entries. All entrants must *completely* fill out the survey and submit it no later than December 1, 1996 along with their name, mailing address, and phone number. Limit one entry per household. Employees of Imagine Publishing are not eligible. Contest void where prohibited by law.

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THE **boot**SURVEY

...continued from previous page

5. What would you like to see more of in the magazine?

- ☐ New technology
- ☐ Industry trends
- ☐ How-to and trouble-shooting tips
- ☐ Hardware reviews
- ☐ Software reviews

6. In general, would you say *boot* articles are

- ☐ Too technical
- ☐ Not technical enough
- ☐ Just right

7. How do you use your home computer (check all that apply):

- ☐ Work brought home from the office
- ☐ Business conducted from home
- ☐ Personal enjoyment

8. What kind of system do you use at home?

- ☐ 286/386/486
- ☐ Pentium 60MHz to 90MHz
- ☐ Pentium 100MHz to 133MHz
- ☐ Pentium 150MHz or higher
- ☐ Pentium Pro
- ☐ Unix Workstation
- ☐ BeBox
- ☐ Other

9. How do you access the Internet?

- ☐ America Online
- ☐ CompuServe
- ☐ Prodigy
- ☐ Internet Service Provider
- ☐ Other
- ☐ Not at all

10. Household Income

- ☐ ‹ $25,000
- ☐ $25,000 to $35,000
- ☐ $35,000 to $50,000
- ☐ $50,000 to $75,000
- ☐ $75,000 to $100,000
- ☐ $100,000 to $150,000
- ☐ $150,000 +

11. How much do you spend on hardware, software, and peripherals annually?

Hardware and peripherals

- ☐ ‹ $1,000
- ☐ $1,000 to $2,500
- ☐ $2,500 to $5,000
- ☐ $5,000 +

Software

- ☐ ‹ $500
- ☐ $500 to $1,000
- ☐ $1,000 to $2,000
- ☐ $2,000 +

commport

hands-on previews, *not* reviews. *Our coverage of these systems did not include benchmarks because these were prototypes, not shipping units. As for the 3Dfx Voodoo Graphics and the PowerVR accelerators being leaders in the same class, we'll reserve judgement on that score until we've had an opportunity to conduct benchmark tests and hands-on reviews of systems using the Voodoo, and systems using the NEC PowerVR chipset.*

As for the quote attributed to Mr. Kennedy, we stand by our reporting.

Pilots are "pretty kewl"

Why do you have to make such a great magazine? I shouldn't have to read your *boot* magazine since I already subscribe to two other PC magazines. But they suck compared to *boot*.

Yer articles and reviews are pretty kewl.

I am a 15 year old guy that is obsessed with computers and technology, so I think you should write about computers and accessories that "we" could use without being Bill Gates. Things like that Pilot PDA interest me. I think it could be handy in school. It looks like it would be good for writing notes from class or getting a phone number from a girl with class.

Taber Lenderwerlen
via fax

I get *Mysty*

T. Liam McDonald's "Game Theory" column makes me wonder, what's wrong with all you computer journalists? Mr. McDonald opens his column with the statement, "I hate *Myst*." I've read words to the same effect in every gaming publication known to man. Why is it that everybody who's a "Gaming Expert" hates the most popular computer game ever made? Quite frankly, I still like *Myst* and I'm not afraid to say so.

Roger Winfield
via Internet

Thanks for writing Roger, and your point is well-taken. Myst *is just one of those games that everyone loves to argue about. In addition to stating his take on it, McDonald outlines the basis for the argument in his last column. The gee-whiz, simplistic nature of* Myst *made it popular. And while it's admired by "Gaming Experts" for it's novelty and innovation, its success has prompted a few too many* Myst *spinoffs—or in McDonald's words, "Sons of* Myst*: the mutant bastard offspring of a fiscally successful game."*

How many bits in a bunch?

In the premiere issue cover story about building a "Dream Machine." You recommend Intel's 200MHz Pentium Pro for us gamers but suggested that we'll be in the "16-bit realm most of the time." Console games are well established in the 32-bit realm.

How soon will 32-bit become commonplace PC gaming technology?

Reid Castillo
via Internet

Windows NT is a pure 32-bit OS that is currently available. Unfortunately it has a very small installed base among gamers, so not many games take advantage of 32-bit code. As the PC platform goes head to head with console games, expect some marketing genius to milk this angle, perhaps as soon as next year .

Non-stick Pam

When I picked up your magazine, it showed *Pamela Anderson* and *PlanIt Playboy* on the CD slipcase. Was this a gross oversight or an attempt to sell a magazine?

John Dyki
via Internet

The Pamela Anderson *piece and a few others were sacrificed when the* Quake *demo became available at the last minute. Unfortunately, we had already sent the magazine to press. You can, however, find the* Anderson *piece on this month's disc. We apologize for the mix up and thank you for your patience.*

God in RGB

Baby, you rocked my world—I could feel you, feel the silicon bounce off my brain in waves of electromagnetic flux that sent shivers through every nerve ending in my body. I was wired from head to toe on your wail; I fell in love; I changed the world—I was there, I was inside the madness. The love spread it's wings over me and breathed, right in me, through me, beside me, in tandem with the ultra love box, the thing that makes it happen, the key—the tomorrow and tomorrow happening today—on this planet, this nation, this world under God, in God—we touch the face of God in RGB interpolation, active matrix reality—He lives. Through here. Follow me. Follow us.

boot me,
Nikki Douglas
via Internet

e-mail: commport@bootnet.com
fax: 415.468.4686
paper: boot commport,
150 North Hill Dr., Brisbane, CA 94005

Now Be Half Way Around The World And Still See Eye To Eye.

"Hey dad, how's it going?"

"Just checking in. What's new at home?"

"Oh not much. Just this!"

(gasp!)

"Gottcha! It's fake."

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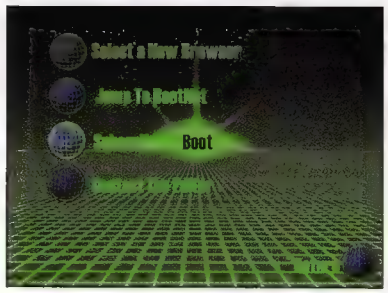
boot DISC

push the envelope



The *bootDisc* is an on-going experiment, which, like *boot* magazine, will push the envelope of what is possible, while learning from its mistakes. Each month, our core mission is to bring you the hottest demos and products. This issue's disc integrates Internet connectivity, allowing you, at the press of a button, to contact both *boot* magazine and the companies featured on the disc, in the magazine, and on the Web. Future issues will bring these three facets even closer together in a dynamic and exciting experience.

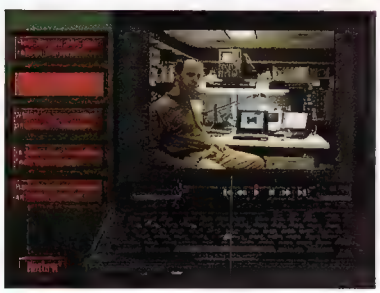
Give us feedback at **bootdisc@bootnet.com** Tell us what you like, and don't like. Tell us what you want to see (Pamela Anderson Lee not withstanding) and how we can make the *bootDisc* the best there is.

Something Old, Something New

The interface looks similar to last month's but there's a whole new engine underneath. The sections have been streamlined into four areas: Features, Lip, Demos, and bootNet. Rolling over any active button will bring up Help text in the display box at top right—if you're unsure about what a particular button does, just move the mouse over it. Background music can be controlled with the blue slider button on the upper-left-hand side.

Features: Make Multimedia Manifestos

Check out our first disc feature story—we're planning to have one or two on the disc each month with dynamic multimedia content you can't get from the magazine. Clicking on the big *boot* logo in the upper right of the screen will take you to the Demos section where you can actually try most of the multimedia software covered in the article.



Lip: *boot* Interviews Ted Selker, IBM Fellow

Hear Ted Selker, from IBM's Almaden think tank, explain the ideas behind the machines you work on every day. A few notes: While clicking before the video starts will get you there faster, it also can cause some audio refresh problems. Use the volume control on the computer by sliding the bar on the right side of the screen to increase or decrease the video volume. The VCR controls beneath the viewscreen work as expected, though some require that the button stay depressed to get the full effect (such as the fast-forward control).

Demos

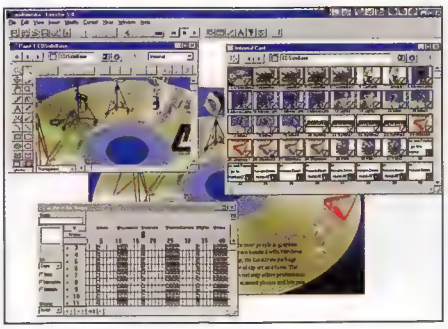
We've redesigned the *bootDisc*'s demo section to make it more intuitive and friendly. Clicking any application will bring up information, a screen shot, and allow you to load it. Pressing the *boot* logo will launch the application (or in a few cases, bring up a window to allow you to launch the program). Check out the special instructions for each program to find out about any specific limitations the demo may have. Clicking on the globe will fire up your resident browser (see the *bootNet* section below for browser info) and take you to a Web site for more information about the product. The Video button will turn green when a video about the software is available; pressing it will play the video; and pressing it again or selecting a different application will stop it. Sometimes the Video button may hang—just select a different application and come back to the original one to start again.

features

Our cover story this month is about **multimedia publishing**, and we're giving you **full-function demos** of all the tools you need to get it done.

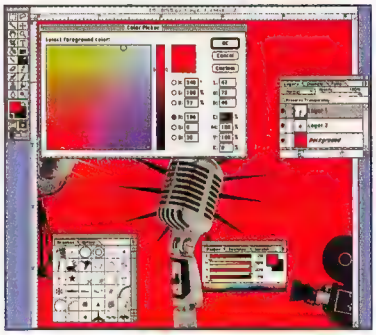
Macromedia's Director 5.0

Translate your vision into seamless multimedia. *Director* is the industry standard for creating interactive apps. It allows you to import and integrate media such as 2D and 3D graphics, animation, sound, and digital video from a wide variety of sources, giving you the power to create absolutely anything; from stunning presentations and interactive advertising to Web pages that come alive with motion and interactivity.



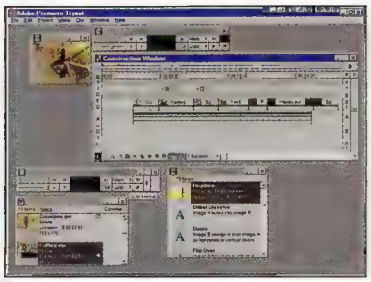
Adobe's Photoshop 3.05

The premiere image manipulation program. Create original artwork, retouch scanned photos, and prepare professional artwork with *Photoshop*. Start with a blank screen or scan an image directly into the program. Then create separate layers—like transparent sheets of acetate—where you can combine graphic elements, paint, and edit without changing the background image. Take advantage of professional capabilities: powerful painting and selection tools, special effects filters, and lighting effects.



Adobe's Premiere 4.2

Build high quality Microsoft Video for Windows and QuickTime digital movies using professional effects and transitions, including motion control, dissolves, wipes, zooms, distortions, and more. Lets you record, create, and play movies with video, sound, animations, photographs, drawings, text, and other material. Simply gather your clips and arrange them in the order you want them to play. Create unlimited layers of moving images. Mix up to 99 stereo soundtracks with CD-quality output.

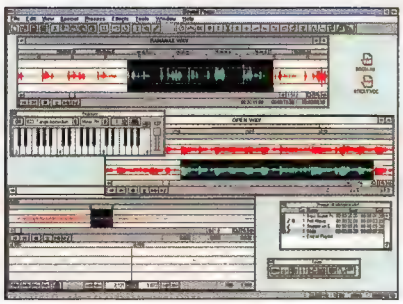


Innovative Quality Software's SAW Plus

SAW stands for Software Audio Workshop. Professional sound file editing and multitrack mixing. Featuring simultaneous playback of up to 16 or stereo tracks, complete drag and drop, non-destructive editing, and live mute/solo buttons.

Sonic Foundry's Sound Forge 3.0

Sound Forge is a powerful 32-bit sound file editor that provides a full palette of pro audio tools.



Also on this edition of the bootDisc*:*

Macromedia's xRes 2.0

xRes allows you to edit high-res files fast with a complete set of retouching, natural texture painting, and compositioning tools. *xRes* has a flexible creative environment with multiple undos and floating text objects.

Macromedia's Action! 3.0

Anyone can create dazzling multimedia presentations combining sound, motion, text, graphics, animation, digital video, and interactivity with *Action*.

Macromedia's Freehand 5.0

This vector-based drawing program gives you the power to draw everything from simple illustrations to complex technical designs.

demos

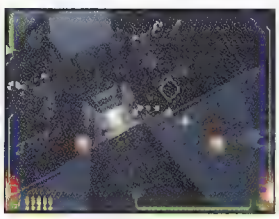
This month the **bootDisc** engages in first contact, where you can meet an **alien**... and **blow it to bits.**

Single Player Games

Deadly Tide

from Microsoft

Hostile aliens are no longer out there in space, but right here on Earth, building massive fortifications in our oceans to exterminate the human race. You're a 26th century Earth Oceans Alliance hydrofighter pilot, and your mission is to blow away every alien and their invading fleet.



Hellbender

from Microsoft

The Bions have killed all the qualified pilots and their next target is the rest of humanity. You're the only human standing between survival of the race and Bion domination.

iM1A2 Abrams

from Interactive Magic

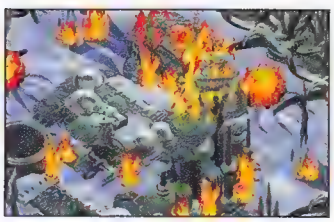
As the mission commander—as well as gunner, driver, and ammunitions loader—of this ultra-realistic M1A2 Abrams battle tank sim, your job is to blast anything that so much as twitches.

Multiplayer Network Games

Gather your friends (or enemies) on the network or on the Net. These demos will let you stomp the tongues of each and every one.

Fire Fight

from Electronic Arts



You're the strong arm of the Phantom Council, the judicial system in a violence-filled future. After the council has handed down a guilty verdict, swift, and often brutal action is taken. Your mission objectives include rescue, reconnaissance, and seek and destroy. *Fire Fight* features an isometric view, rendered graphics, parallaxing backgrounds, digitized speech, and heart-pounding action for one to four players.

DeadLock

from Accolade

Seven races compete to own one planet. Explore this new world, develop its resources to the fullest, and make decisions affecting the growth of your colonies. Economic, military, and technological superiority lead to triumph. Your race will suffer if you fail. Contains installers for EarthLink, TEN, and Mplayer.

Quake

from id Software

The next evolution of *Doom* is here! In the far-flung future, mankind has perfected the Slipgate Device, enabling instantaneous transportation from one place to another. An other-dimensional entity (code named Quake) has discovered our slipgates and is using them to send death squads into our world. This must be stopped. You have an appointment on the other side of a dimensional slipgate with an army of HellSpawn and traffic is a bitch.

ShellShock

from Eidos

So, kid, you're the rookie member of 'Da Wardenz'? Hmmm... You really think you can hang with this covert group of M-13 predator-tank commandos? Before you answer, remember: *Everything* is destructible. Including you.

Leisure

Software to kick back with and get creative

Pamela Anderson Playmate Portfolio

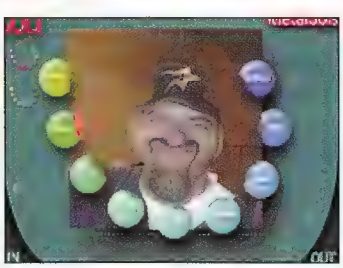
It was promised on the first *bootDisc*, but was bumped at the last minute for the release of *Quake*. Now it's here... get yer motor runnin'.

Shockwave

How interactive multimedia is viewed on the Web.

PowerGoo, Kai's Power Tools 3, MetaTools Convolver

A potent trio of graphics tools from the twisted mind of Kai Krause. Check out the rave review of *Goo* in this issue of *boot*.



the web

Imagine Publishing
is pleased to announce the launch of the *boot* magazine **World Wide Web** site at:
http://www.bootnet.com

bootNet sports many of the exciting features that make *boot* magazine so valuable to the hard-core home PC enthusiast. There are reviews and previews, bootWorthy products, and an expanding archive of *boot* articles online. *boot* magazine, the *bootNet* Web site, and the *bootDisc* CD-ROM work together to create a truly integrated multimedia experience. Search the site for keywords, chat in real-time with other readers and the *boot* editors, post messages in our forums, and see the *boot* team at work. This site is live and will be updated daily with the freshest news bytes available. We also feature a download section for the latest drivers and patches. Want to write a letter to the editor? No problem. Want a second opinion on that new PDA before you plunk down $500? No problem. Just want to drool over stuff that no mere mortal could afford? We have that too! Of course all this cutting-edge technology comes with some strings attached: You'll need a JavaScript & frames-capable browser (we recommend *Netscape v3.0*). A minimum screen res of 800x600 and at least 16-bit color is also highly recommended for optimal viewing. In the near future, VRML and ShockWave plug-ins will be required as well, but for now they're not.

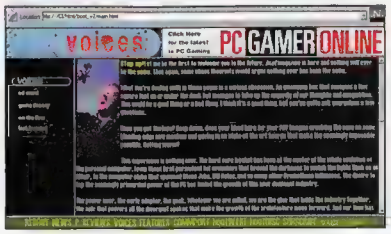
If you're always climbing to the pinnacle of the fast-paced tech world, you probably already have these basics; if you're standing still, get your boots on!

NEWS:

bootWire features the latest news, updated daily; bootDeep gives you in-depth analysis of the key stories that have broken on the bootWire; and bootRadar picks up the latest cool PC products appearing on the horizon.

P/REVIEWS:

bootWorthy highlights a particular category of products and examines the best of the best. You'll also find no-bunk reviews and advanced previews of all the PC hardware and software you care about.



VOICES:

Columns by *boot*'s talented writers, a few words from our editor, and some special guest contributions.

FEATURES:

Showcasing the feature articles that appear in *boot* magazine each month, this is where you'll find a variety of in-depth stories as well as a peek into next month's issue.

COMMPORT:

Want to contact us? We want to hear from you. This section is the most interactive part of *boot*'s Web site. It has letters to the editor, bootForums, and bootRap where you can discuss your passion for the cutting edge with other like-minded individuals. There will be a live camera feed, and a profiles section introducing our staff. Plus a list of advertisers' links so you can find out more about their products.

bootWARE:

Get your grubby lil' hands on the latest downloadable drivers, patches, and coolest demos around.

bootDISC:

This area will help integrate the *bootDisc* bundled with *boot* magazine, with current information available via the Internet for a seamless transition from print to disc to Web and beyond.

SUBSCRIBE:

You came, you saw, you lusted for! Fill out this subscription form and enjoy the printed parent of *bootNet* with extra pictures and more articles to peruse at your leisure.

bootNet

It is our intention to integrate Web access throughout the *bootDisc*. The *bootNet* section of the disc will allow you to jump to our Web site or subscribe electronically to the magazine. Because of all the browsers available, we let you select your preferred browser.

Windows 3.1 Users and Glitches

The *bootDisc* now works under Windows 3.1 as well as Win 95. (Simply launch bootCD16.exe to run under 3.1.) For 3.1 users who have problems getting the premiere *bootDisc* to run properly, there is a patch available at **www.bootnet.com/bootdisc.html**

The *bootDisc* is designed to run best under true color (16-bit or 24-bit mode)—we will be making it friendlier for 8-bit graphics cards next month. If you encounter problems with the Demo section for Macromedia *Shockwave 3.1* just hit Continue when the dialogue box appears.

Credits

Multimedia is seldom the product of one hand, and the *bootDisc* is no exception. *boot* would like to thank Moonshine Music and Silent Records for the background tracks, and Eric Marcoulier for arranging all the legal niceties. This product was made with Macromedia *Director*, Adobe *Photoshop* and *Premiere*, and significant quantities of Dr. Pepper.

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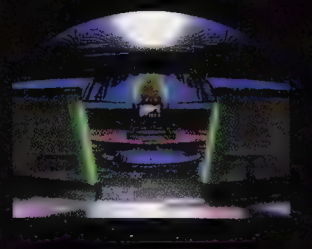

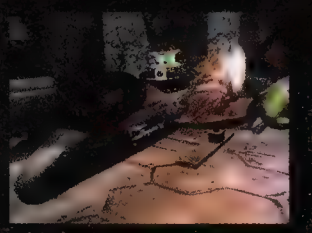

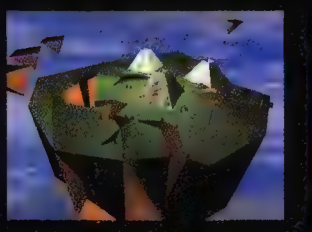

five FAQ's about the most unique maze/adventure game ever!

who?
you! immersed in the first-person perspective, you play a renegade hacker trying to destroy an insidious virus launched by Rood O'Dor, an evil genius out to trash the world's computers.

what?
vertigo! negotiate real-time 3-D interactive mazes featuring multi-threat traps, dizzying pratfalls, and puzzling enemies by mastering a progressive set of gravity-defying skills.

where?
cyberspace! surf to 18 virus-mutated maze-like worlds, free-floating through a bizarre interpretation of the Internet.

when?
october! at your local software retailer.

why?
because! PC game players deserve the same mind-bending thrills, spills, and skills formerly available only on high-end cartridge games.

Surf AND DESTROY™

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CD ROM

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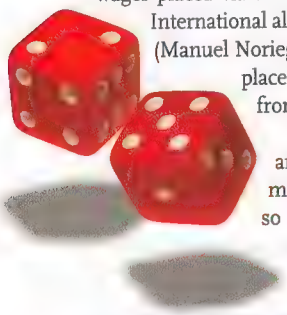
Risky Business

Gambling On the Internet is Catching On

U.S. law strictly prohibits betting over any network that crosses state or international borders—so *naturally* Internet gambling is growing wildly popular. Interactive Gaming & Communications Corp., incorporated in the state of Delaware in June 1986 to develop a market for the home delivery of video cassette rentals, has launched Global Casino (**www.intersphere.com/bet/casino**). Once connected to the digital gaming establishment, you can place bets for real money from the comfort of your own home. On May 11th, 1995, Sports International Ltd., a subsidiary of IGC, pioneered gaming technology by accepting the very first wager placed via the Internet. Operating from Antigua, Sports International allows customers to set up offshore accounts (Manuel Noriega aside, offshore prosecution is rare), and place wagers using a toll-free telephone number from anywhere in the world.



Emerging technologies in encryption and digital cash transactions keep the G-men's prying eyes out of your "investments," so stop by and say "Ciao paisan!" to Rina Moscariello, from IGC's board of directors, and tell 'em *boot* sent ya.

You Make the Call

Telegroup, a long distance service provider, has launched a Web site called the Call Cost Comparison (**www.call cost.com**). Enter the details for a proposed domestic or international phone call, including aspects such as time of day and business or residential calling accounts, then the site checks which long distance service (AT&T, Sprint, MCI, or Telegroup) provides the best rate. Telegroup claims the Call Cost Comparison "does not always recommend Telegroup." In fact, when we considered a hypothetical call from California to New Jersey, Telegroup was the most expensive of the four services.

Intel: *Ready to Rock*

Chip manufacturing giant Intel has entered an agreement with MTV to create M2: Music Television (not to be confused with Cyrix's impending M2 processor or Matsushita's M2 chip purchased from 3DO). Viewers dialed into the Intercast version of the cable music channel can simultaneously watch MTV and peruse Web sites related to the program, artist, or personality on the air. Intel will handle the technical development for the channel and will promote it on MTV starting this fall. Come to think of it... we have been seeing Andy Grove and Jenny McCarthy hanging together a lot lately.

Ex-Dictator is Videogame Nut

General Augusto Pinochet, former dictator of Chile, is an avid videogame player. So much so, that it's affecting his health. According to *The Economist* magazine, Pinochet spends hour upon hour playing games on his PC. Not surprisingly, he prefers war games. The general has been glued to the monitor to improve tactical thinking in his fast-modernizing army.

Unfortunately, all this comes at a price. His eldest son claims that the magnetic fields from the computer have affected the 80-year-old Pinochet's pacemaker and sent him into hospital with high blood pressure.

Don't Cry for Me, Madonna

While it may strike some as a mite strange that Madonna is playing Eva Perón in the film adaptation of Andrew Lloyd Webber's Evita, it seems even more strange that the soundtrack will be released as a two-disc enhanced CD set. Given Microsoft's recent abandonment of the format and the wave of companies that followed suit, surely this is the last thing the struggling format needs. Then again, if the discs have online links to all the Argentinian Web sites dedicated to bagging the material girl (one site describes her as a "silly American whore who has no right playing Argentina's infamous former first lady"), it might be fun.

Hillary vs. Liddy

When voting in November, consider economics, diplomacy, vice-presidential candidates, and... First Ladies. At first glance, the cover line on *Time* magazine's July 1 issue, which read, "Hillary vs. Liddy: Who would be the better First Lady?" made us think of the intriguing possibility of G. Gordon Liddy as First Lady. Of course, they were speaking of Elizabeth "Liddy" Dole. We e-mailed *Time* to suggest that our man Liddy would make the best first femme, and Marcus Bales, *Time*'s Pathfinder Webmaster, was kind enough to respond. "Well, I have to say that in my humble opinion, you're right. Of course, if you printed that you'd have to wear your Kevlar and hope that Liddy disobeyed his own instructions when he caught up with you, eh?"

Mildred Pierce Reporting from the Web

"Body modification" enthusiasts have been lining up to creatively pierce and scar online characters at www.mildred.com. According to a recent press release announcing the site's first anniversary, more than half a million people, including "civic and religious leaders from 15 different countries," have visited the site to compete for prizes such as bamboo finger traps, '80s memorabilia, and clown wigs.

Netscape Goes to War

Browser manufacturer talks strategy about version 4.0

If you were Netscape, you'd be sweating too. Just a few months ago, the company's Web browser was the best on the market. But then came Microsoft Internet Explorer 3.0, *a browser with all the functionality of* Netscape Navigator 3.0—*not to mention Java and plug-ins support—that also includes support for ActiveX, an OLE-based technology that challenges Netscape's plug-in strategy by hosting external apps directly in the browser window. It's too early to declare a clear winner in the browser wars, but, without a doubt, Microsoft has cracked open its war chest to unleash serious development and marketing capital on its backpedaling competitor.*

How will Netscape enter the second phase of battle? boot asked Netscape for the definitive word on the next incarnation of its Web browser, and received product marketer ***Daniel Klaussen.*** *We focused on* Galileo, *the browser that will go head-to-head with* Internet Explorer 4.0 *(code name:* Nashville*), which will be seamlessly integrated into the Windows OS—a formidable distribution strategy, indeed. While Netscape's lips are (mostly) sealed, in an attempt to avoid discussing features that may not appear in the browser's final release, Klaussen reveals the mood at Netscape these days: It does not behoove the company to release too much "intelligence" during wartime.*

Daniel Klaussen last worked for Collabra, a company that Netscape purchased a year ago to strengthen *Navigator*'s business collaboration tools.

boot: When will we start seeing 4.0 betas? When do you hope to ship final code?

DK: We expect that you'll begin to see *Galileo* betas some time this fall, and we plan to ship the final version by the end of the year.

boot: Netscape and Microsoft are now on concurrent tracks to release new browser versions at roughly the same time. How will *Galileo* go head-to-head with *Internet Explorer 4.0* and its integration into the Windows OS? Why is *Galileo* a better "platform" solution than *Nashville*?

DK: Microsoft doesn't share its development schedule with us, so we can't comment as to whether or not we're on concurrent tracks for release of the 4.0 versions of our products. Ditto for them sharing their alphas and betas with us, so again, we can't comment as to how we fare head-to-head with 4.0 integration into Windows OS. What I can say is we're designing *Galileo* to be a great solution for people wanting to improve communication and collaboration within and outside their organizations. A large part of why it's a better platform solution is our development technologies are essentially platform independent, and our clients run on about as many platforms as Microsoft has products.

> "...our development technologies are essentially platform independent, and our clients run on about as many platforms as Microsoft has products."
> — Daniel Klaussen

boot: Let's look at specific differences between *Navigator 3.0* and *4.0*. What kind of new features can we expect to see?

DK: We haven't announced *Navigator 4.0* yet, nor have we begun disclosing the details of specific features and functionality. There will be no mistaking that what users are seeing is new and cool.

boot: What about plain, old HTML? How will *Galileo* push HTML tagging for hobbyist designers who don't want to wrestle with tools such as Java and Shockwave?

DK: *Navigator* has been, and will continue to be, an innovator in this arena. While I can't comment as to what specific tags we will be adding, hobbyist designers should be quite happy with the flexibility, control, and sophistication they'll be able to achieve through just regular HTML.

boot: How far is Netscape willing to push HTML standards? Will HTML someday offer the design flexibility of page design apps such as *Xpress* and *PageMaker*?

DK: We want to make sure that the basics of our product are meeting our users' needs. The page design flexibility of applications such as *Quark* and *PageMaker* are available today, through the use of Adobe's PDF format and PDF plug-ins.

boot: Why is Netscape waiting until 4.0 to include style sheets? This is an HTML 3.2 standard and *Internet Explorer* is supporting it in its 3.0 version.

DK: Our support for style sheets has always been planned for *Galileo* and not *Atlas*. In the meanwhile, we've included some tags in 3.0 that help users achieve today some of the most critical needs in layout. We prioritized according to what the most users would get the most value out of most quickly.

boot: Your white paper says *Galileo* will offer improved security for downloading Java applets. Describe the nuts and bolts of how this will work.

DK: We're making sure our security enhancements for Java applets will be implemented in a smart way that protects the user, first and foremost, while giving Java developers more flexibility. Users will be able to configure how Java applets and other signed objects are handled. This configuration will be based on a number of properties of the object, including its origin, and the signer of the object. For example, a typical corporate user might ▶22

!EXCLUSIVE! BREAKING NEWS!

Trilobyte Nears Extinction

Creative duo splits up, 11th Hour *bombs*

The 11th Hour **broke industry records when it was released last Christmas.**

An inside source revealed to *boot* that Trilobyte's co-founders Rob Landeros and Graeme Devine are no longer speaking, and as a result, the company may soon close its doors.

The source, who wishes to remain anonymous, says Devine has assembled a crew of online game developers and moved them from the Trilobyte Medford, Ore. headquarters to a separate building, despite the fact that the Medford office was not filled to capacity.

When asked if he and Landeros are still speaking Devine answered, "Of course we are. I still own a large chunk of Trilobyte and I can still kick his ass at *Links LS*." He also said he moved his online team to the new office because they were packed in a small room; and the best way to concentrate on the new project full time was "to be somewhere else."

In a recent press release, Trilobyte officially announced the online team as both "an online division of the company" and "a wholly-owned subsidiary." Our source called the release a variation on the "Emperor Has No Clothes" story. "You have to read between the lines," said the source. "Graeme sent an e-mail around a month ago that said, 'In the words of Paul McCartney, I've got my band and that's all I need.'" Devine says he did send that message.

In either case, the move to develop low-bandwidth online games is a huge shift in direction for the company that has become famous for producing high-bandwidth interactive movies such as *The 7th Guest* and *The 11th Hour*.

Clandestiny **is the only CD-ROM title Trilobyte currently has in production.**

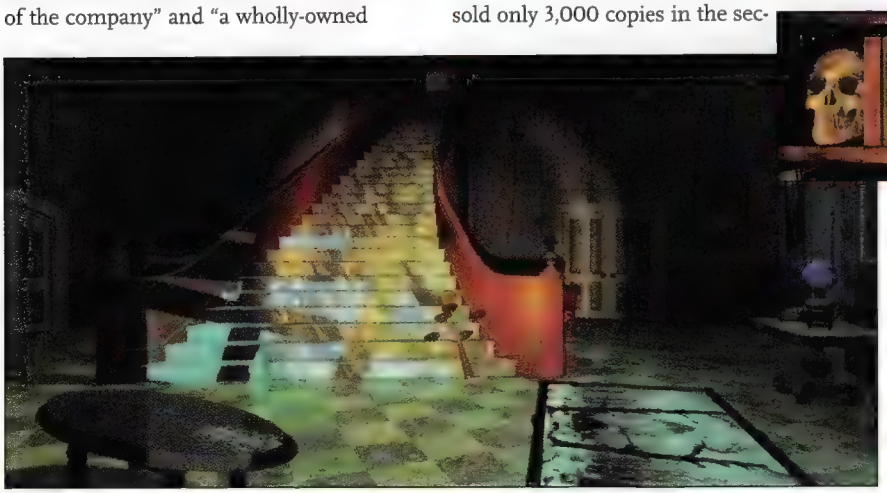
Although *The 11th Hour* broke CD-ROM industry records with its initial pressing of 500,000 copies and $4 million budget, it has suffered in retail stores and been returned en masse partly because it is not truly Win 95-native. According to our source, the game sold only 3,000 copies in the second quarter of 1996 and Devine has received just $24 in royalties since it was released with a massive ad campaign last December. Devine would not comment on how much he's pocketed from the title, but said he believes the total number of *11th Hour* units sold through in the U.S. is 350,000.

> **"Everything's going to be the same but I'm getting the hell out of here."** — boot *source*

We were told that several employees, including the lead programmer of the company's highly anticipated new title, *Dog Eat Dog*, have left the company out of sheer frustration. "They put $800,000 into *Dog Eat Dog* and there's nobody left on the project," says the source. "It's a complete failure."

The source also tells us that Paul Allen, Trilobyte's primary shareholder, is unaware of these goings-on. And those still working for the company are starting to reconsider their positions. "It's like you're on the Titanic and the captain is getting on a lifeboat saying, 'Don't panic. Everything's going to be the same but I'm getting the hell out of here."

— *Doug Lombardi*



Despite the large budget and initial pressing of 500,000 copies, ***The 11th Hour*** **hasn't been in the top 20 in months. But its predecessor,** ***The 7th Guest,*** **has continued to be a best seller.**

Enhanced CD Format Takes Fatal Blow

Win 95 driver set proves incompatible with pre-gap discs

Since its inception, the enhanced CD (ECD) format has struggled with technical problems and a lack of enthusiasm from record companies and the buying public. The latest pitfall is a recently discovered issue of incompatibility with Win 95.

Anyone with a post-November 1995 version of Win 95 has a driver that is incompatible with ECDs mastered with the pre-gap solution (meaning, the multimedia data is located on track "0"). According to Sam Henderson, technical evangelist for CD Extra at Microsoft, the incompatibility was caused by Microsoft's fix for another problem. "A few weeks after we released Windows 95, a major system vendor discovered the CD-ROM drives they were OEM-ing would not play audio CDs under Windows 95," he said.

The fix for that issue caused the OS to be incompatible with pre-gap mastered discs, which make up more than half of the titles currently on the market including Jackson Browne's *Looking East*, Bonnie Raitt's *Burning Down the House*, and The Rolling Stones' *Stripped*. Ironically, Soundgarden's *Alive in the Superunknown* was originally released in November of 1995 as a CD Extra disc (known then as CD Plus), with the data located after the audio tracks. The title was remastered as a pre-gap disc and re-released by Nu.Millennia because, at that time, CD Extra discs were incompatible with the firmware in NEC and other CD-ROM drives.

> Representatives from major labels, such as Virgin and American, have flat out said they will not be making any more enhanced CDs.

Microsoft had endorsed CD Extra (a.k.a. CD Plus) as the standard for ECDs from the start and, according to Henderson, advised the record labels to pursue that technology for this format. Microsoft has no plans to release a fix for the incompatibility with pre-gap discs.

This, coupled with the initial lack of enthusiasm for the format, paints a relatively dim future for ECDs. Representatives from major labels, such as Virgin and American, have flat out said they will not be making any more enhanced CDs. Philips, who released the Cranberries' *Doors and Windows* ECD almost immediately after the standard was established, only has music CD-ROMs currently in development. And Sony—codeveloper of the standard with Philips, Microsoft, and the Recording Industry of America (RIAA)—is releasing CD Extra discs with only limited multimedia content and no label indicating enhanced nature.

From EBN's pioneering ECD, *Telecommunication Breakdown* (right), to Fiona Apple's debut, *Tidal*, the ECD format has struggled.

Some independent labels view the situation quite differently, however. "Combined with Internet access, video footage, photos, and other content, [ECDs are] a great bonus for consumers as well as being a very cost effective marketing tool for labels," says Lane Dunlop, vice president of Nettwerk Records and Nettmedia.

— Doug Lombardi

CD-ROM Speeds Faster than Ever

Manufacturers jump from 8x to 12x

By November 1, the first generation 12x CD-ROM drives will be released, making the pace of CD-ROM drive upgrades more rapid than processor evolution.

Only a few months after releasing 8x drives, major manufacturers are poised to ship 12x units in time for the holidays. Philips, Plextor, and Toshiba have said that 12x will be the next level and that 10x is being bypassed completely.

Felix Nemirovski, general manager of the engineering division at Plextor, says manufacturers are moving directly to 12x because the difference between 8x and 10x is marginal at best. In fact, he says, the only reason Plextor is making a 12x is to stay competitive. "The next important step is 16x," says Nemirovski.

Pinnacle Micro's 10x CD-ROM drive is one of few.

Although most games have a minimum requirement of a drive as slow as 4x, or even 2x, games such as Activision's *SpyCraft* that stream heavy data loads can benefit from drives as fast as 8x. The need for speed will become even more important as hardware manufacturers raise the bar on other system components.

"One of the things [manufacturers] are going to do this Christmas is have P200 systems with on-board 3D graphics and audio," says Akyra Pagoulatos, director of CD products at Philips. "The biggest bottleneck, in this situation, is getting the info out of the CD-ROM drive. You need the speed to make [the apps] look nice and pretty."

The majority of manufacturers agree that CD-ROM drive peak speeds will be realized late this winter at 16x. At the same time, however, that conclusion will be offset by the introduction of DVD-ROM drives (which run at a speed equivalent to 8x CD-ROM drives).

— Doug Lombardi

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◀18 maintain a profile of seven trusted sites from which Java applets can automatically be downloaded without obtrusive security warnings, while applets from other sites would cause *Netscape Navigator* to carefully query the user for an approval before downloading the object.

boot: Do you think there's any chance that a version of *Navigator* will someday offer native support for ActiveX?

DK: We'll do our best to support what our customers need. However, at this time we don't plan to offer native support for ActiveX OLE. Customers who need this functionality can get a third-party plug-in component that provides this functionality. We plan instead to focus on lighter-weight, cross-platform technology. Remember, we're also interested in providing great support for other Windows applications such as Microsoft *Office*.

boot: The white paper says *Galileo* will load missing plug-ins automatically. How will this work? Walk the end user through this seemingly wonderful improvement.

DK: If I walked you through everything, I'd spoil all the surprise. Again, we're just working to make sure our model is more intuitive for users.

Klaussen speaks with his hands, but his actual words are none too revealing.

boot *also spoke with Netscape product manager* ***Alex Edelstein.***

boot: What kind of improvements are we going to see from 3.0 to 4.0?

AE: I'll start with a couple of areas where the largest things are going on. Collaboration is a big piece of it. We purchased a company called Collabra about a year ago. Ever since then, that team has been working on improving the mail, news, groupware, and collaboration capabilities of *Navigator*. And that means radically improved e-mail as well as radically improved news. We want to make it much easier and effective to use news groups inside and outside the organizations. We want to make it easy for ISPs to create ad hoc news groups that are very specialized—people to be able to create virtual teams that work over the Internet using news groups. We want to increase even more the integration between the technologies.

> "It's not like there's an icon, and you double click... and that loads a browser. It's like, BOOM! There it is, that's your message..."
> — Alex Edelstein

Today, you can receive a message in your Netscape mail in HTML. You click on the message and it's HTML. It's not like there's an icon, and you double click on this icon, and that loads a browser. It's like, BOOM! There it is, that's your message, that's your Rich Text Format. In *Galileo*, when you compose your e-mail, you'll have all the *Netscape Navigator Gold* authoring tools: the bolding, the underlining, the italics. All of that Rich Text Formatting. It's not like we're the first mail company to provide Rich Text in e-mail, but we're the first to provide it in something as open and universal as HTML.

When I worked at Microsoft on *Exchange*, we did Rich Text, but it was closed. It was like you only made any sense if you were sending it to another guy who was using *Exchange*. If I sent it to you, and you were using *Eudora*, it would come out as this colossal attachment of garbage. With HTML, the worst it comes out as is text, but the really nice thing is we expect that the *Eudoras* of the world will support HTML because it's so obvious, and you'd have this much richer e-mail.

So that's just collaboration. A lot of new layout stuff, too: Web fonts, style sheets. We don't get nearly as much user request for style sheets, but it is part of the approved HTML standards, so we do want to support it.

boot: You don't receive a lot of requests for style sheets?

AE: Not from real users. When Web designers come to us, what they tend to ask for the most is, "I want to be more precise. I want to specify which layer these graphics are on." These are the things we're focusing on in *Galileo*. So there's a bunch of new layout control, and there's support for video conferencing and audio conferencing. Java also becomes a much richer platform in addition to the LiveConnect you have today. Java will be higher performance. Let's see, that just touches on some of the biggest points. User interface will also be dramatically overhauled, but that's hard to describe.

— Jon Phillips

Alex Edelstein knows the enemy well; he used to work for Microsoft.

"ABSOLUTE GARBAGE."

—Slime Magazine

"PURE TRASH."

—Ratweek

"P.U."

—The Daily Urinal

"IT STINKS."

—The Sunday Compost

"TWO THUMBS UP (OUR NOSES)."

—Fungus & Mildew

RATING PENDING
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CONTENT RATED BY ESRB

For PC and MAC CD-ROM and PSX.

"WE COULDN'T HAVE SAID IT BETTER OURSELVES."

— The Blubs

The Blubs, your average family of space aliens, are in a heap of trouble. They've crash-landed in a garbage dump and need you to help them put their ship back together so they can get back home to their less odorous planet. That is, before a gang of intergalactic bank robbers can get ahold of them. Find out why the critics are calling *Down in the Dumps* the funniest, best-looking and smelliest 3D graphic adventure game ever to (dis)grace a computer screen.

PHILIPS

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pure dust

HIGH-TECH **TOYS** AND **TOOLS** WITH THE RIGHT STUFF

Speak to me

Sycom Technologies' Total Recall digital voice recorder (model VN900-23, $199) crams enough memory in its two- by four-inch case to store 23 minutes of messages, but weighs only three ounces. The handheld device features ample cut-and-paste editing of your digital voice memos, but Sycom's *PC Audio Link* software enables you to transfer the messages to your PC through your sound card, and then store them as WAV files. The $59.95 *Link* kit also includes an audio cable and an AC adapter.

Sycom Technologies; 800.773.2503

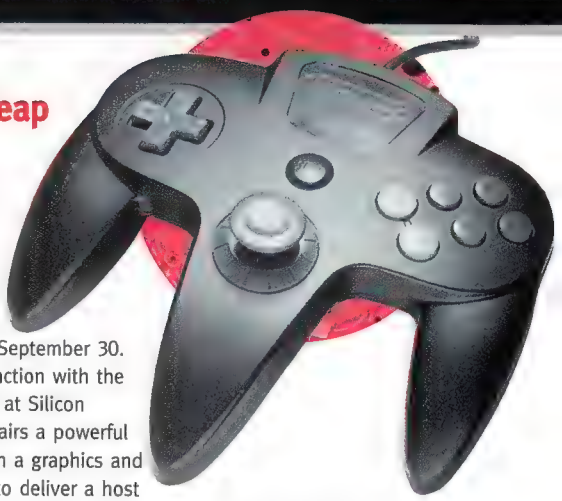
Paging Mr. Jordan

Your favorite major-league team is in the playoffs, but you're stuck in a conference room watching mind-numbing presentation number 352. What to do? Get a SportsTrax. This $199 pager device, designed by Motorola, discreetly delivers two-minute updates on all the baseball or basketball games for three years, after which the pager becomes "a collector's item" according to the user manual. "Please recycle responsibly if you choose to dispose of the unit," it continues.

Using satellite technology and radio frequencies in the 900MHz spectrum, SportsTrax delivers each game's start time, the current game scores, team stats, and individual stats for both team's top five players (updated at the half and post game). The device even produces audible signals at the start of the game, two-minute warning, home runs, and end of an inning or period.

Available through High Street Emporium; 800.362.5500

One giant leap for Mario



The Nintendo 64 is causing a sensation in Japan, and the next generation videogame console will finally be available in the U.S. on September 30. Developed in conjunction with the workstation wizards at Silicon Graphics, the N64 pairs a powerful 64-bit RISC CPU with a graphics and sound coprocessor to deliver a host of impressive features, including: Z buffering, trilinear mip-map interpolation, and real-time perspective correction.

Unlike the Sega Saturn and Sony Playstation, N64 games will be distributed on cartridges, not CD-ROMs. Games available at launch will include *Mario 64*, *WaveRace 64*, and *Pilotwings 64*. Nintendo has designed a unique three-prong controller, with an analog joystick that sprouts from the middle of the pad. Priced at $249, the N64 delivers sharp 3D graphics for less than the cost of a PC 3D graphics accelerator.

Nintendo of America; 206.882.2040; www.nintendo.com

Six degrees of excitement

Looking for the ultimate chair for your favorite flight sim? Check out Virtogo's Cyber Air Base. The C.A.B.'s bucket seat is bolted to a platform supported by an array of pneumatic cylinders. Responding to motion codes embedded in the software (or from a custom joystick that Virtogo is designing), the cylinders rock the chair with a full six degrees freedom of movement. Go into a dive and the chair leans forward, climb and it leans back, encounter flak and it buffets you from side to side.

The C.A.B. can be customized and is equipped with RS-485 and RS-232 ports in its base, plus four other programmable control ports that respond to both analog and digital datastreams. You can even link and synchronize several units together to create a carnival-style ride. Built with industrial grade robotics and materials, a single chair C.A.B. sells for $10,500; a system with two bucket seats for $15,500. Yes, Virtogo does offer discounts based on quantity.

Virtogo; 800.490.5608

compiled by Adam Douglas

I sync, therefore, I am (on time)

Texas Instruments' new line of Si personal organizers features a docking station that automatically synchronizes the device's database with the contact manager software on your PC. Indiglo night-light technology provides high visibility in low-light conditions (such as a darkened airline cabin).

TI's model PS-6960Si, shown here, has 256K of memory; a 6-line by 24-character display; a calculator; a world clock; and reminder alarms. The organizer and connecting kit are available separately ($195 and $75, respectively) or bundled together (model PS-6965Si) for $239. Two other models are also available: The PS-6760i with 64K of memory ($110) and the PS-6860Si with 128K ($149).

Texas Instruments; 800.842.2737; www.ti.com

Videophone 101

Ideal for telesurveillance, the Casio Phonemate LT-70P can transmit full-screen, high-resolution images with simultaneous audio over a single analog phone line using a standard television. The sequential video format displays a standard full-frame image every 3.5 seconds, or a high-resolution image every 30 seconds. Images can be captured with the unit's built-in camera, or via camcorder or digital camera. These can then be stored in the internal memory, and printed on an optional video printer. A forthcoming model (the LT-70PC) will feature a PC link and multiple-camera control for complex presentations. The LT-70P retails for $1,899.

Casio Phonemate; 310.618.9910; www.casio-usa.com

We have integration

Cellular phones are turning into Internet appliances. AT&T, Mitsubishi, and Nokia are all set to ship models featuring wireless access to the Internet and the World Wide Web. AT&T's PocketNet Phone and Mitsubishi Wireless' MobileAccess Smart Phone take advantage of Unwired Planet's *UP.Link* software. *UP.Link* features HDML (Handheld Device Markup Language, a derivation of HTML) to produce Web pages tailored to these small screens.

The menu-based interface is accessed with the cellular phone keypad. Information requests—such as business queries, news, weather forecasts, and so on—are routed through AT&T's wireless IP network and the Internet, and processed at the Web server. Both phones will be available late in 1996 and initially sold only to corporate buyers, with retail distribution following soon after. Prices are expected to start at about $500.

Finland-based Nokia Group, meanwhile, has introduced the Nokia 9000 Communicator in Europe. This device combines a cell phone Internet access device with all the functionality of a high-end PDA.

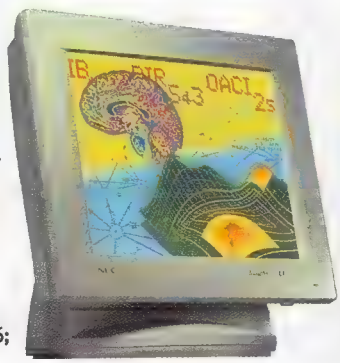
Equipped with an embedded 386 processor, 8MB of flash memory (including 2MB of user storage), and Geoworks' GEOS 3.0 operating system, the 9000 combines send/receive data/fax capabilities, a calendar, an alarm clock, a Web browser, an e-mail terminal, and a cell phone into a handy 14-ounce package. Flip open the clamshell-style device to expose a miniature keyboard and a 640x200 LCD. If you need to make or take a call while the 9000 is open, it will even function as a speakerphone. Files can be transferred to a PC using either a serial cable or via infrared link. Nokia has not announced when the 9000 will be available in the U.S. At current exchange rates, the gadget would fetch around $3,000.

Nokia; 800.666.5553; www.nokia.com
AT&T; 800.552.3373; www.att.com
Mitsubishi Wireless Communications; 408.730.5900; www.mitsubishi.com/groups/mwci.htm

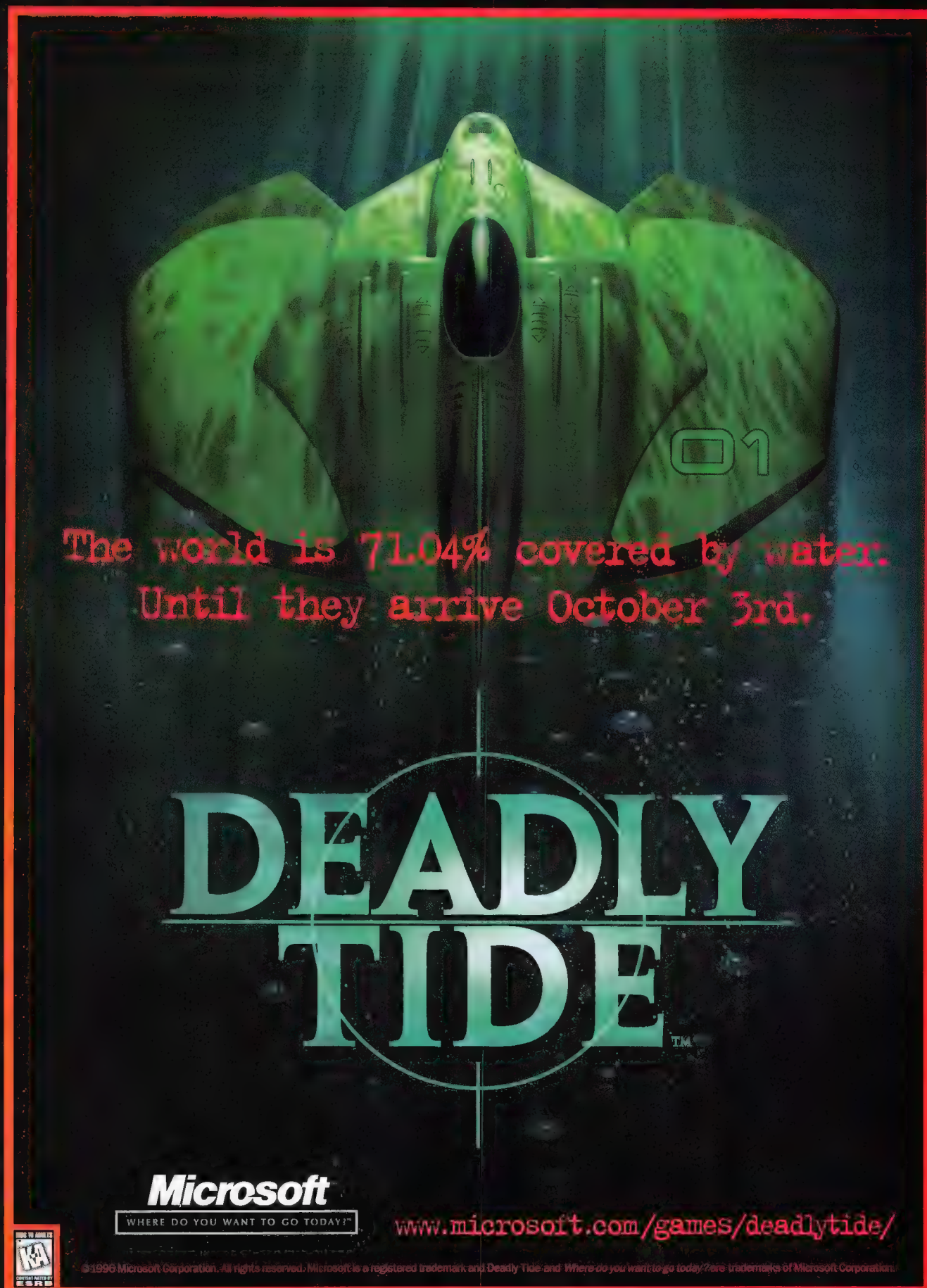
Decrease your depth

LCD monitor technology continues to advance while dropping in price. NEC's latest model, the $5,999 MultiSync LCD300, features a 13-inch active matrix TFT LCD with a maximum resolution of 1280x1024 and a minuscule dot pitch of 0.20mm. The device accepts analog RGB video, so it's compatible with a wide range of graphics cards.

The monitor is capable of displaying more than 16.7 million colors in a continuous spectrum and delivering the same viewable area as most 15-inch CRTs. Measuring just 6.7 inches deep, the LCD300 consumes a very small footprint. And since it weighs only 8.8 pounds, it can easily be toted from one location to another.



NEC Technologies; 800.632.4636; www.nec.com


The world is 71.04% covered by water.
Until they arrive October 3rd.
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THE VIDEO TRAP

FOR **BETTER** OR **WORSE**, FMV IS HERE. **DEAL** WITH IT!

Remember *Night Trap*?

If you do, it's probably not on account of the game itself, but because it made U.S. Senator Joseph Lieberman so hoppin' mad, he exclaimed, "I wish we could ban these constitutionally."

The "these" he spoke of were, of course, video and computer games. I, for one, am glad to see that this country is in such fine condition that we can now turn the full power of legislative might, not to mention constitutional law, toward such pressing social issues as what 14-year-olds do with $39.95. That whirring sound you hear in the background is Thomas Jefferson spinning madly in his grave.

It's strange how this parallel universe came to be. *Wolfenstein 3D*, replete with Nazis, swastikas, and extreme violence, never raised a blip on our public servant's monitor. *Doom*, with its occult symbols, flesh-chunking shotgun blasts, and images of nude impaled corpses, didn't initially attract their attention either.

But throw washed-up child actress, nude *Playboy* model, and part-time thief Dana Plato in front of a video camera, threaten her with a really big drill, turn it into a game, and suddenly we're in trouble. It never seemed to matter much that the game was *really* bad. Digital Pictures, publisher of *Night Trap*, has a knack for creating games that probe the profound depths of awfulness. The people at DP make porn producers look like Fellini. But they touched a nerve for one special reason: the power of the moving image.

Video images have a power that animation or 3D rendering can't achieve. Video images have impact, like the beating Rodney King took or an episode of *Cops*. Once developers realized the potential of CD-ROM, it was inevitable video would find its way onto computer screens. It was also inevitable that this new tool would take some time to learn, like an 8mm camera in the hands of a teenage film student.

The big controversy with video, in the eyes of gamers, doesn't have to do with censorship though. It has to do with video's crummy track record. Face it. FMV-based games are here and they're here to stay. Hard-core gamers are going to have to overcome prejudices created by past attempts to integrate the passive act of watching TV with the gamer's adrenaline desires. And while developers slowly learn to use the medium to enhance gameplay, considerable technical issues still need to be resolved.

The largest hurdle is that your vanilla PC architecture was simply not designed to crunch the massive amounts of data that constitute video. Every second of full-motion video requires 30 frames, each of those full-screen frames is made up of hundreds of thousands of data blocks, and your typical video card can only move a small portion of that deluge. For example, one standard uncompressed second of video is comprised of about 10 million bits of information. This single second of uncompressed video takes up about 27MB, and no PCI bus can hope to move 27MB in a real-time second. What you have here is a bottleneck.

A gotta-have-it piece of MPEG-specific software needs to hit, and it hasn't, and it probably won't.

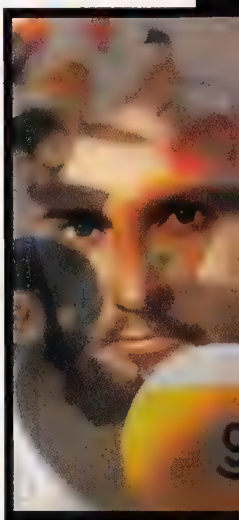
But alas! There is a solution (or two).

Developers can write software to the MPEG standard, which specifies a hardware coprocessor designed solely to handle video tasks. These tasks are passed off to a separate MPEG board, such as Sigma's RealMagic, rather than being routed through the CPU. The result? Smooth-running, full-screen, full-motion video. Trimark's *Silent Steel* is a fine example of just how good MPEG can look (although gameplay itself was limited to only a few hours).

There's no question. MPEG works... when supported. And manufacturers were only too glad to sign on to create a single hardware standard, and developers are happy to only write a single set of drivers. The problem is: Your typical half-slot MPEG card costs more than a good VCR (about $300), and very few software titles *really* use MPEG.

Look around. Despite the enthusiasm voiced by developers, there is no killer app designed exclusively for MPEG on store shelves, ergo not many users have gone out of their way to purchase MPEG hardware, ergo there is no demand for MPEG software, ergo there is not likely to be a killer app. From an economic standpoint, the software drives the hardware, not the other way around. To summarize: A gotta-have-it piece of MPEG-specific software needs to hit, and it hasn't, and it probably won't.

Not satisfied, the Motion Picture Experts Group went back into the labs and came back with an even *more* efficient standard, called MPEG-2, which does an even *better* job of processing video. But despite software-based MPEG decoders for the fastest of CPUs, and the fact that more and more computer manufacturers are shipping units with one of the MPEG variants, its impact on gamers will not be huge. Unless someone breaks rank and builds software for these systems.



If developers are roundly ignoring MPEG, how are they bringing us the magic of titles such as *Night Trap, Supreme Warrior,* and *Quarterback Attack*? The more popular way to flow video is through software codecs. Where MPEG broadens the stream to alleviate the bottleneck, compression schemes lessen the flow by reducing the density of the data. Video files and *Autodesk* animations can be crunched using lossless and lossy algorithms, which replace long repetitive sequences of image data with smaller place holders. These tools find the redundant data within each frame (and from frame to frame) and simply remove it, leaving behind a smaller file that flows much faster through the CPU. There's give and take: some image degradation ▶ 98

T. LIAM MCDONALD is the all-knowing god of gaming. He also writes about computers, literature, and horror for numerous mags.

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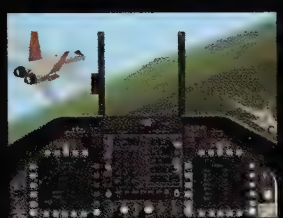

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MY SITE OR YOURS?

VRML IS PUTTING THE VIRTUAL INTO "VIRTUAL COMMUNITIES"

With the final version of the VRML 2.0 spec presented at SIGGRAPH 96 (which might as well have been called VRMLGRAPH 96) and all the recent press about the 3D Web standard, it's clear VRML is well on its way into the hands of the next generation of power consumers. And as the new and improved immersive Web (and the tools to manipulate it) drills pathways into the desktops of perhaps millions of Americans, the question becomes what to do with these magic beans.

The first application of the technology that will catch the attention of the white collar world will inevitably involve advertising. After all, it's a new medium to colonize, and commerce is what drove Columbus into his yacht. Imagine a 3D Coca-Cola can randomly appearing on the table of the virtual nightclub you haunt—double click and have a case sent to your home. Other business applications should follow: database design, shared work environments, and shopping, shopping, shopping. Also add to the list more noble education possibilities. (Gateway 2000 has been feeding its tech support people 3D interactive training for years.) But what really drives the VRML vision is the alluring, yet tragically aloof, concept of Neal Stephenson's *Snow Crash* Metaverse, the three-dimensional, interactive, multiuser community, complete with avatars, homes, and your very own aluminum-plated cyberdog.

But why go virtual?

After all, every day we see and interact with dozens of people. And everyone knows it's significantly more fun to throw Frisbees to a feisty retriever than it is to type command lines to your cyber-fido. Right?

But look at the world as it is today, and it makes perfect sense that people are looking for new ways to form community.

Every day our lives are filled with an increasingly less stable collection of relationships. We look for new jobs, new lives, and the ever elusive "community." We don't know if we'll have a job tomorrow, if our significant others will leave, or even who the next door neighbors *really* are. The chaos, expansion, and evolution of our society has destroyed conventional notions of community.

But as humans, we adapt. We follow our instincts. We go to great lengths to actualize this need for community. We have been taught, from *Sesame Street* to *ER*, that our society places a high value on community. If our world is growing devoid of consistent physical community, we will build a virtual one. This principle is the cornerstone of cyberspace.

The Web has done a magnificent job of catapulting the Internet and its communal concepts into mainstream society. It has shown us the potential of chatting with the world and learning about new people with new ideas. In less than two minutes, you can point and click your way over to an architect in Australia or a physicist in France—people you would have never known otherwise.

Yawn, yawn, yawn. I hear you. "OK, OK... I've been in an AOL chat room and now I'm bored."

But add to the chat model avatars that travel and communicate within a 3D environment and suddenly the scope expands. This model utilizes familiar communication paradigms. I look at you and I speak. We are real people, with real ideas, even within the sphere of digital communication. 3D takes away the black hole and adds a backyard.

The people who are exploring and building worlds now are VRML pioneers with strong ideas about how to build community.

Paragraph International (www.paragraph.com), makers of the consumer VRML authoring tool *Virtual Home Space Builder*, recently held a symposium to educate the media about the state of 3D Web space. VRML cofounder Tony Parisi (CTO of Intervista Software, www.intervista.com) sat on a panel with David Frerichs of SGI's Cosmo division (Cosmo is slated to be the first of SGI's two VRML 2.0 browsers, www.sgi.com), and Paragraph's Mitra, a key voice in the development of the VRML standard. When Parisi was asked, "Why build 3D worlds?" The answer was loud and clear: "It's about creating community and enhancing human communication."

Skeptics complain the VRML technology isn't up to speed yet. File sizes are too big. Navigation is clunky. And at press time there wasn't even a 2.0 browser beyond alpha stage. But in some ways that works to the advantage of building strong communities.

The biggest gripe about the Web is that it's too cluttered, too confusing to navigate, and a serious assault of information overload. In contrast, because 3D worlds are just starting to emerge, and the proprietary solutions (nonVRML 3D environments such as Worlds Inc., www.worlds.net; Onlive Technologies, www.onlive.com; and Black Sun Interactive, www.blacksun.com) are still relatively small, it's easy to digest what's happening in these spaces. With relatively few people in any given room at any given time, smoother conversations (both voice and text-based) can be carried on without the distractions of anarchistic background noise and polluting eye candy. Also, the people who are exploring and building worlds now are VRML pioneers with strong ideas about how to build community. It's their job.

The breakdowns in technology, if anything, are helping us slow down and think about the worlds we are creating. When the technology does burn through the field like wildfire and VRML becomes commonplace, (and I'll wager my wireless modem that it'll be sooner than later), the groundwork being built today will endure and facilitate wonderful worlds to not only sell cola, but to build solid, stable relationships that we as a society crave and need.

"See you after work... my site or yours?"

SHEL KIMEN (skimen@imagine-inc.com) Web Director for *the Net* magazine, www.thenet-usa.com, has spent more time online than is reasonably healthy for one person and dreams in hypertext.

VOICE

SHOPPING SPREE

GETTING WHAT **YOU WANT**—AND **NEED**—IN **A PORTABLE**

You've decided it's time to buy a portable. Well, I have some good news and some bad news. Now is a good time to buy a portable computer because the number of manufacturers building notebooks is increasing. This means you'll be able to choose from a bigger field filled with better systems.

The bad news is although the portable price/performance ratio has improved, you still get more bang for your buck with a desktop. A Micron P133 desktop with 16MB of EDO DRAM, 1.6GB hard drive, 28.8Kbps fax/modem, 8x CD-ROM drive, and a 15-inch monitor will cost you as little as $1,999. A laptop with a similar configuration and a 12.1-inch active-matrix screen will set you back at least $1,000 more. And once you empty your wallet, you may wait a month or longer to get that five- to seven-pound screamer in your eager hands because LCD manufacturers can't keep up with the demand for larger screens.

"Get a cheap screen, and your decision will haunt you every time you turn on your machine."

ANGELA LoSASSO is *boot*'s managing editor and a mobile maniac.

But trust me, if you plan to compute on the road, there are plenty of machines worth the wait. Many notebooks are fully loaded multimedia marvels offering 16-bit, Sound Blaster Pro-compatible sound, built-in stereo speakers, 6x CD-ROM drives, video in/out ports, MIDI, and beautiful screens that rival 15-inch desktop monitors both in terms of resolution and in viewable area.

When you put together your shopping list, your first consideration has to be the CPU. Top-end portable manufacturers are moving toward Intel's 150MHz Mobile Pentium (although Nimantics recently announced it was offering a laptop that uses Intel's 166MHz *desktop* Pentium—see the preview on page 70), but you'll find most manufacturers (including IBM, Compaq, Texas Instruments, Gateway, and Dell) shipping notebooks using 2.9-volt, 133MHz Pentiums.

The portable you buy should have at least 1.2GB of hard drive storage and 16MB of EDO DRAM. More is always better, of course, and you should make sure there's plenty of room for expansion. TI's TravelMate 6030 and IBM's ThinkPad 760 series can be expanded to 72MB and 80MB of RAM, respectively.

Unless you want the lightest, thinnest, simplest notebook you can buy, you'll want a built-in CD-ROM drive, because most software is delivered on disc. Most portables in the mid- to high-end range offer modular 4x, 6x, or 8x CD-ROM drives. Modularity means several devices—the floppy disk drive, an extra hard drive, or an extra battery—share the same space inside the chassis. There's no real weight savings, because you'll probably want to take all the devices with you anyway. Swapping a CD-ROM drive with a floppy drive so you can load data from a disk is inconvenient at best; pulling out the CD-ROM drive and installing a second battery within the confines of your airline seat and seat-back tray table is asking for trouble.

If you want to avoid these problems, look for a notebook that has multiple modular bays that can support up to three batteries or drives. Compaq's Armada 4100 has an optional Mobile CD unit that offers CD-ROM capabilities, a hookup for a third battery, enhanced stereo sound, and a MIDI/game port. Most notebooks, however, support a maximum of two batteries (typically lightweight lithium-ion models) and squeeze life out of them with efficient power-management utilities.

You'll also want a portable that warns you—with an audible beep, a flashing LCD, or both—when your battery is running low. There's no experience more frustrating than having your laptop unexpectedly shut down while you're running an application or playing a game.

As you use your new laptop, the component you'll become most intimately familiar with is its display. Get a cheap screen, and your decision will haunt you every time you turn on your machine. Fortunately, the resolution, color, size, and overall quality of laptop displays has been steadily improving. Laptop screens range in size from 10.4 inches at the low end to the whopping 13.3-inch screen that NEC recently announced.

Now that you know what to look for, you must decide where to buy your mobile marvel. The major retail chains, such as CompUSA and Fry's, offer good prices, but not necessarily the best selection. Buying direct from the manufacturer might cost a bit more, but you can choose from a wide selection of models. Many people believe mail-order and factory-direct companies, such as Gateway and Dell, are the way to go.

Just remember to do your homework: Read plenty of reviews, check ads for the best prices, and cruise the Web for new announcements and in-depth product information. Then get on the road! b

CONTACT INFORMATION:

Company: Toshiba America Information Systems
URL: www.toshiba.com

Company: Compaq Computer
URL: www.compaq.com/productinfo/notebooks

Company: Texas Instruments
URL: www.ti.com/notebook

Company: Sharp
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URL: www.gw2k.com

Company: IBM
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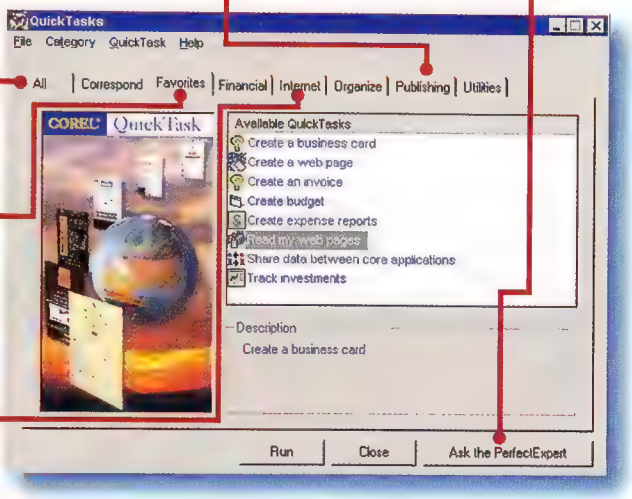

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INVEST IN POWER

P200, P55C, PRO, MMX, M2, K6, P7: A BUYER'S GUIDE

Pity the poor investor who can't decide which stock to buy, when to buy, or how much to spend. Is it worth holding off until the next Labor Department report on inflation and employment? Will stock prices be lower after corporations post their quarterly earnings? Heck, maybe the safest plan is to postpone any big decisions until after the elections.

Wait a minute! This sounds an awful lot like the agony of deciding when to upgrade or replace your computer. In fact, I wouldn't be surprised if *boot* readers sink more money into their PCs than into the stock market. And why not? Unlike stocks, PCs are a sure thing: Your investment is guaranteed to drop through the floor, usually by 50 percent a year.

Unlike stocks, PCs are a sure thing: Your investment is guaranteed to drop through the floor, usually by 50 percent a year.

If you're a PC hot-rodder, you know what I mean. When innocent novices ask me how much to spend on a computer, I tell them, "around $3,000 to get started, and about $1,500 a year to stay current." In other words, if you want your PC to run the latest software painlessly, you'll probably average $1,500 a year on upgrades (faster CPU, more RAM, bigger hard drive, etc.). Or else you'll buy a $3,000 computer every two years, or a $4,000 computer every three years. Any way you slice it, keeping up with the Gateses will cost you about $1,500 per annum.

With that in mind, how should you plan your PC investment over the next 12 months? A year ago, it was easy—just buy the fastest Pentium you could afford. But now we're entering one of those transitional phases when things aren't quite so clear.

This fall, the fastest Pentiums are cruising at 200MHz. But the Pentium 200 looks an awful lot like a stopgap product. Intel is introducing another new Pentium this fall—code-named P55C—that will deliver superior performance at the same clock speed by virtue of larger onboard caches (32K vs. 16K) and new MMX instructions that accelerate multimedia software. P55C systems won't appear in quantity until 1997, but anyone buying a Pentium before then will probably wish they'd waited a few months.

Meanwhile, Intel is trying to make *all* Pentiums obsolete by pushing the Pentium Pro as the mainstream CPU for 1997. Does Intel's right hand know what its left hand is doing? You bet. The Pentium will be four years old in 1997, and that's about the duration of an x86 generation. Thanks in part to hot competition from Cyrix—whose 150MHz 6x86 slightly edges a Pentium 200—Intel needs to move the market toward its sixth-generation CPU. The Pentium Pro has the higher prices and profit margins that Intel needs to maintain its leadership in manufacturing capacity and fabrication technology.

So, the Pro looks like the obvious choice for power users, right? Uh, maybe not.

Pros are slower than Pentiums when running 16-bit software, they typically require more complicated motherboards, and they don't support MMX.

If you've made the transition to Windows NT and 32-bit applications, you might not care about the Pro's 16-bit slothfulness. Most PC users, however, are wedded to their 16-bit software. (Windows 95 *claims* to be 32-bit, but still has a lot of 16-bit code.) You might upgrade from a Pentium to a Pro only to discover your programs don't run any faster, and that's no fun. So if you're into games and multimedia—and who isn't?—the P55C starts looking pretty good, after all.

Hold on! Early next year, Intel will bring out a new Pro (code-named "Klamath") that supports MMX *and* improves 16-bit performance. To simplify Pro motherboards, Intel has a new 440FX chipset that whittles down the number of PCI interface chips from eight to three and also reduces motherboard layers from six to four. In addition, the less expensive chipset has a bus-mastering IDE interface and a USB interface. Most users won't miss the few features it sacrifices: only one PCI bridge instead of two, RAM expandability to 1GB instead of 2GB, and two-way memory interleaving instead of four-way interleaving.

But Intel isn't the only chip vendor that wants to put a rocket in your socket. In early '97, Cyrix will release a new version of the 6x86 (code-named M2) that will run at 180MHz to 200MHz, can drive its I/O bus at 75MHz (compared to 66MHz for the Pro), will have 64K of onboard cache (four times as much as the Pro), and promises MMX compatibility. Later versions could hit 250MHz. And unlike the Pro, the M2 has no trouble with 16-bit software and fits handily into a Pentium socket.

Don't forget AMD, either. The K5 series isn't a contender, but the K6 should be available in 1997. It's supposed to match or exceed the Pro's performance. And thanks to a patent cross-licensing agreement with Intel, AMD's MMX compatibility is a safer bet than Cyrix's.

Finally, there's Intel's seventh-generation x86: the P7, a.k.a. Merced. But I don't think the P7 should affect your plans for 1997. Prices will be sky high until about 1999, and the P7 may require new software to deliver optimum performance. Think of the P7 as the next upgrade after your next upgrade.

My advice? Avoid the Pentium 200... if multimedia matters. The P55C, M2, and K6 all look better, but be wary of the M2 until its MMX compatibility is proven. If you can afford to, wait for Klamath. Or hold out until late 1997, when the Pro should hit 300MHz. Meanwhile, you can invest all your idle cash in a nice, boring mutual fund.

TOM HALFHILL is a senior editor at *Byte* magazine and the author of two computing books. He first became interested in computers during the disco era.

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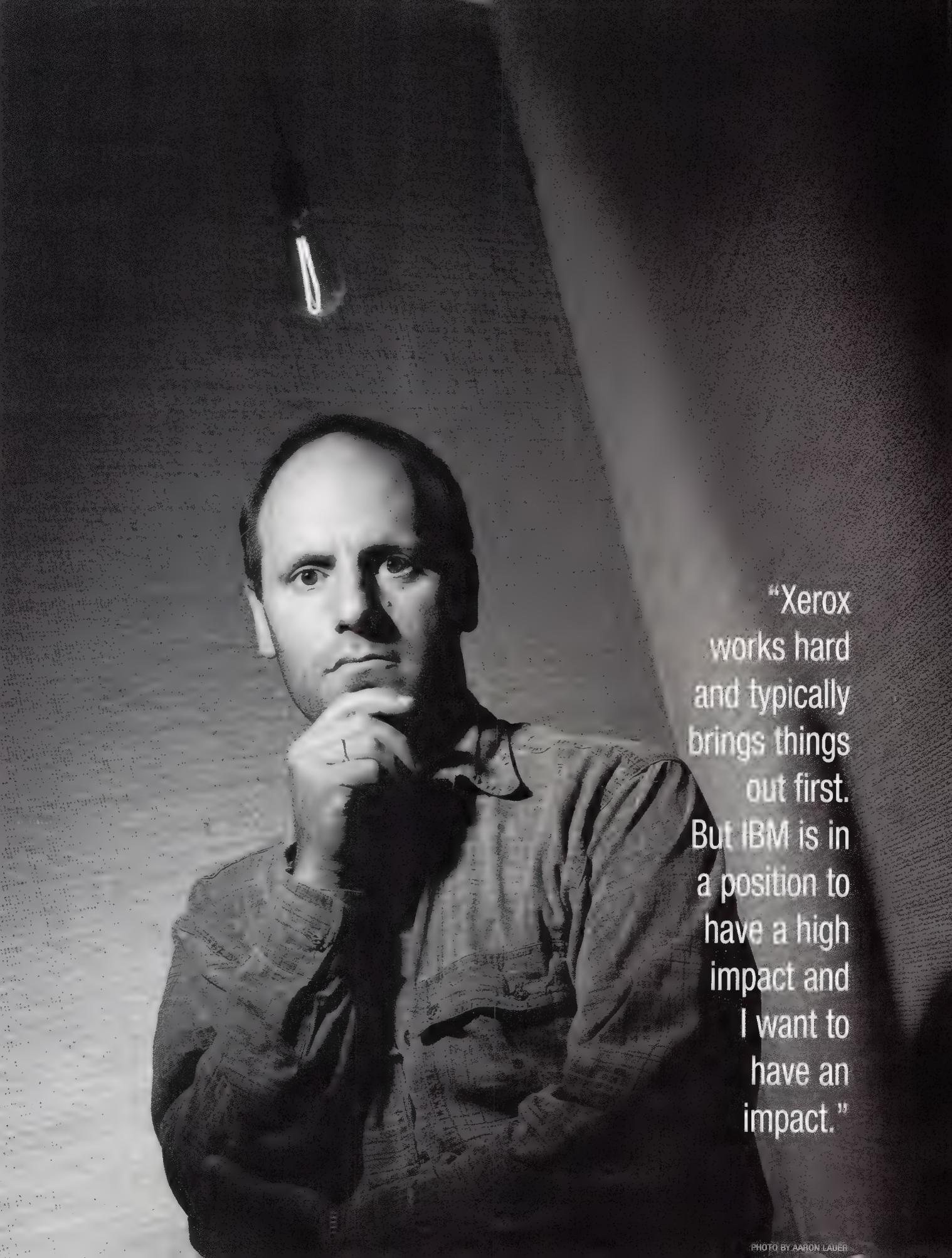

"Xerox
works hard
and typically
brings things
out first.
But IBM is in
a position to
have a high
impact and
I want to
have an
impact."
PHOTO BY AARON LAUER

E.J. "TED" SELKER

Sitting in his lab at the IBM research facility nestled in the sun-drenched hills above San Jose, E.J. Selker talks about smart machines and even smarter people, and how his inventions get them to communicate. Many know Selker as "Ted," some know him as the father of the TrackPoint, most know him as...

IBM's Thinkman

boot: The IBM facility here at Almaden is very impressive. What's your job here?
SELKER: I'm an "IBM Fellow." [laughs] And that's a new title for me. I'm the manager of a group called User System Ergonomic Research and we work on graphical, physical, and cognitive interface. My Ph.D. training is in artificial intelligence and I've brought myself up learning about modern tool building technologies, so that's how I got into computer science and A/I. But there is something about myself that's always interested in understanding and creating physical things. My fingernails are always dirty. I'm always building things.
boot: But how did you wind up here? How does one get to be an "IBM Fellow"?
SELKER: I was always this way, even as a child, I wanted to be an inventor. People used to think of me as a flake, and they'd say so to my face. And I'd be very embarrassed. I was always upset by this, and, as a result, I was always doing bigger and bigger projects. I was at Xerox PARC for a while, but I could see that I was only a little part of a bigger project. So when I got an offer to go demonstrate that I could create on my own, I decided to leave Xerox and go to IBM for a couple of years, I thought, and maybe finish my Ph.D. At the same time, I did lots of other things—I like to use one activity as a recreation from another activity.
boot: What's an example of an "other" activity that has taken you somewhere unexpected?
SELKER: I once made an Atari 800 run a force-feedback ski boot. And this gadget [holds up a small box with a wire coming out and a pen attached to the end of the wire] was sufficient to actually land me a job at Atari. Unfortunately, Atari did not survive very long as a place where ideas can survive. But still... it's amazing to me that a scientist's best tool is the pen. It's shocking how much we use pens in this day and age of high tech. So, I went and made a pen that is better than a pen.

"Unfortunately, Atari did not survive very long as a place where ideas can survive."

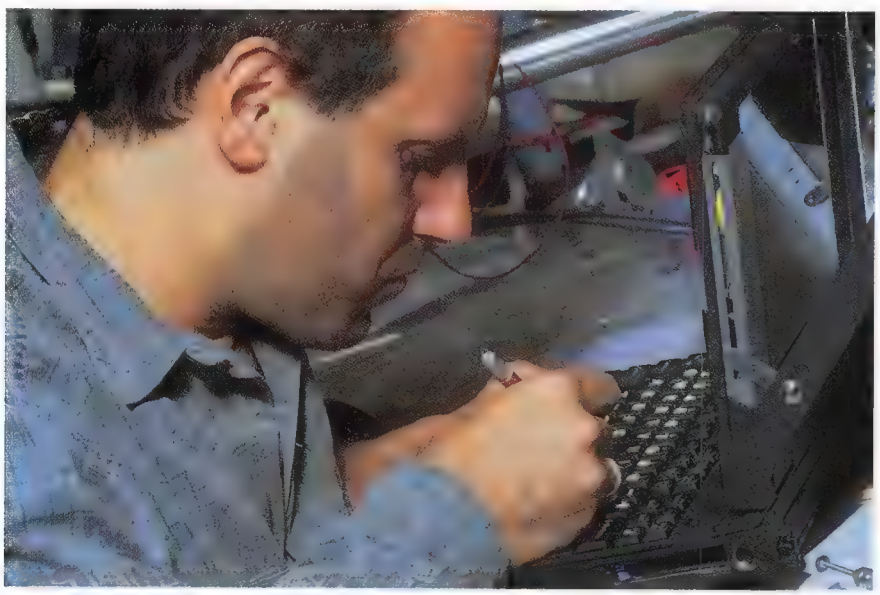
boot: Is *everything* fair game to improve on?
SELKER: Sure. I mean, on one hand, I'd like to encourage others to improve on their own work. And I prefer to work on things other people are not working on, so lots of people will get to have these tools and solutions. There is this struggle: Am I a jealous inventor or a generous inventor?
boot: So which is your role in the world?
SELKER: I've always been a guy who likes ideas. In the last few years, I've been lucky enough to have a few of my ideas turn into things that lots of people are using. Specifically, the TrackPoint device that allowed IBM to get into the notebook market. The TrackPoint embodies a lot of the ideas I consider important. Working from the scenario of understanding how people and machines work together, in order to create a tool that allows people to work better with their computer.

Since the early 1900s people have been playing with keyboards, because they could

type twice as fast as they could write. But in the '80s, we started integrating graphical interfaces and, unfortunately, it takes 1 3/4 seconds to grab a mouse. I started thinking about how to integrate the keyboard and the mouse. It was a long and scientific road to integrate analog selection into the [keyboard] space, but still, I didn't think it was going to be a big deal.

"You don't make things easy to use by saying they are easy to use. You only discover it by watching other people's responses."

Well, it turns out people had not been able to make a joystick with the performance quality needed to make selections before. They didn't understand the synchronicity of finger and eye tracking speed. They didn't even know what the problems were. By building a joystick into the keyboard, I found myself in a position of making that move. We had lots of ideas that were proved wrong, and we slowly improved the TrackPoint by scientific experiments to the point where TrackPoint 3, which is currently available on IBM notebooks, can outperform any pointing device for mixed typing and selection.



"There is something about myself that is always interested in understanding and creating physical things," says Selker from the IBM think tank in Almaden where he creates the future. "My fingernails are always dirty."

I like to think about a problem and then design a tool to solve it and I get excited about it.

boot: For your ideas, do you spend more time studying people or their machines?

SELKER: How do you make *things* serve *people*? It's a tough balance to be fascinated with machines without forgetting your religion. I think being obsessed with things is what is necessary to making anything work. But if you stay obsessed about anything specific, you don't have any perspective. I try to keep a balance.

My religion is being interested in people.

I start off with a scenario and try it myself. Then, I have other people try it and I run human factor experiments to get data out. I love data. Data is very different from just wondering if it works or just trying it out. I was reading this Unix page about some mail program this morning and it said it was "a comfortable, easy-to-use way to send and receive mail," but it was amazingly arcane. You don't make things easy to use by saying they are easy to use. You only discover it by watching other people's responses.

It's like this notion that a hammer is ready to use in your hand. You don't sit there and learn about it. It just makes nailing a lot easier. And after it is in your hand, you don't think about the hammer, you think about the plywood.

boot: The hammer makes nailing easier; what does the computer make easier?

SELKER: Well, people use everything to augment their thinking. When I'm designing, sometimes I'll go into a hardware store. I'm using the hardware store to help me think. And I go to the woods to declutter my mind. Anything we pick up and start using becomes a part of us.

The computer allows tremendous potential. I get to try out ideas and express them faster. I take this laptop computer everywhere, and it has everything I need on it. It is the opposite of the Web. Instead of being all "over there" at the end of a pipe, it is all "over here." And if I'm in a meeting and need to show everyone something, I just put it on an overhead projector, and whatever I've been doing suddenly becomes public. I'm able to share my arguments, my ideas, and my perspectives. I've sat in a room full of people arguing and put up one image on this laptop, which focused everyone's attention, and the arguments have stopped. It just changed the direction of the conversation. People don't have as good a memory as they want, so keeping the idea in the air keeps it in everyone's consciousness.

Sometimes people need a large amount of visual memory in front of them to understand an idea. Imagine a lot of papers scattered out in front of you. What if we projected these things onto a wall, everyone points at them with laser pointers, and you can actually pick them up off the wall with a laptop device. Now you can spread out everything on your table and see it up on the wall without having to take it out of the filing system. This is a working prototype of a product we call "Room with a View."

boot: This sounds like an advancement of the concepts behind the Web.

SELKER: [Laughs] Isn't it miraculous that just as we declared mainframes, and that god-awful half-duplex interface IBM got every airline in the world to use, dead, along comes the Web? We decided as a community to rebirth servers. We have reinvented centralized computing, so everything is everywhere anytime. And this is all in direct contrast to the notebook computer, which has been selling more and more.

Another reason we need the centralized servers is socialization, which is really only possible on the Web. The Web will sink down into our unconsciousness—just as the VT-100 is not something you think about that often but was miraculous in 1979 when it became possible to look at a whole screen page at once.

boot: Will people treat their Web browsers like the next VT-100 or like TV sets?

SELKER: Well the VT-100 is more of a television for me than television is [laughs]. It's not the Web browsers, but the content. We have RAT, a WBI [Web Browser Intelligence] that looks at information and decides how valuable it is, relative to things you looked at

Selker's ever-present laptop casts the screen image on a wall with the aid of a common overhead projector. "I've sat in a room full of people arguing and put up one image... and the arguments have stopped," he says.

in the past. After looking at a few sources, we found that the Web had *no* information. And newsgroups were almost just as bad... compared to the abstracts. So when I search, I need a consistently reliable source of information. This is referenced material. On the Web, you don't know when something is *really* published and when it isn't. It's kind of disjointed, like the gossip approach to finding out information. When we treat the Web as seriously as we do our libraries, there will be quantifiable value.

boot: Do you feel there should be an overseer to filter ideas on the Web? And who should that be?

SELKER: Yes, I do, but I don't want to get into that now.

boot: Well, [pause] how many great ideas are there here in this office?

SELKER: We probably get one or two a week.

boot: How many make it to the marketplace?

SELKER: In any research environment, I use the number five percent. About five percent of our ideas—maybe more here—actually get deployed.

boot: What is one of your recent ideas that actually went public?

SELKER: Last week we put a proxy on our site on the Web that you can download, which watches what you do and watches what the Net does. It lights up each link it finds with either a red, orange, or green light. The red light means it's down, the orange light means it might take a while, and the green light means it should be quick to get to. It sits as a background application trying to build intelligence by just watching what you do.

I'm very excited about the idea of watching behavior and building intelligence. I remember there was a paper I once read that said it would be impossible in the foreseeable future to have a computer that could keep up with your rate of using the computer and figure out anything by reasoning and learning. At that point, the challenge becomes: Can I make a computer that does reasoning and learning at the same time? My *COACH* [Cognitive Adaptive Computer Help] application sits and annotates your graphical user interface. *COACH* records statistics of whether you have used something before, how many times you've used it, and then uses that information to decide what kind of help will be appropriate for you.

boot: Will you take this approach to the next level? Where the system actually "thinks" and starts to configure itself?

SELKER: Well what you have here is an "implicit" agent, and it acquires the knowledge without your implicitly acting on it. Agents can be either assistants or advisors. *COACH* was an assistant that proved to be five times more helpful than an advisor. I think the assistant is the most exciting kind of agent. The first agent I ever made was for a kaleidoscope program, which changed if you pushed a lever. This system can take an art critic and turn him into an artist. If assistants keep doing things for you, a private language develops between you and the computer. And this private language speeds you up. I think it's great for me to learn things, but I also think it's great for me not to have to pay attention to things.

boot: So what is goal ultimately? Is it to train the user or train the machine?

SELKER: It is to get things done. I believe in evolution and, now, we are training the computer. It is amazing that machines are of any value at all. I think the big jump for humans is to be dealing in this manner with inanimate objects. We *are* going to party together. We're fortunate that we're able to have representations that are transferable without the filtering of ideas.

boot: What do you see the user interface evolving toward? Is Windows the ultimate, or will some 3D virtual world replace it?

SELKER: Well, when I'm reading text, I don't read it in perspective. I read it flat. Reading is one time when people can focus on ideas. I love the whole authoring process of text. And I don't see it embellished by three dimensions. But there are a few three-dimensional things you can do to text, like illustrating history or the previous versions of the text. Dimensionality is only one of the techniques that our body is good at incorporating. Perceptual experiments show that drop shadows in menus tie into our shadow memory. Turns out there are about six other phenomena we detect well. We can tell convexity very well. But drop shadows

Using the sun as a backlight for his laptop, Selker steps outside the think tank to "declutter his mind."

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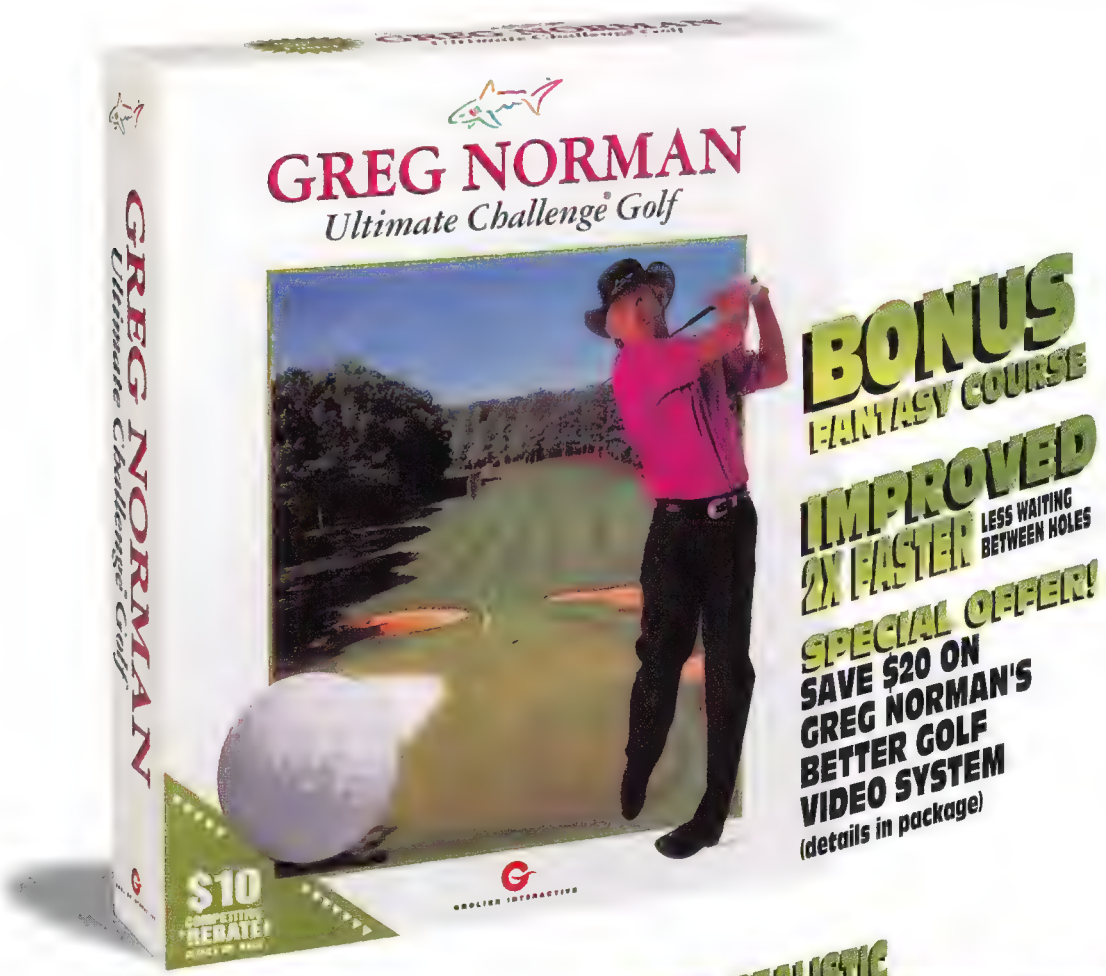

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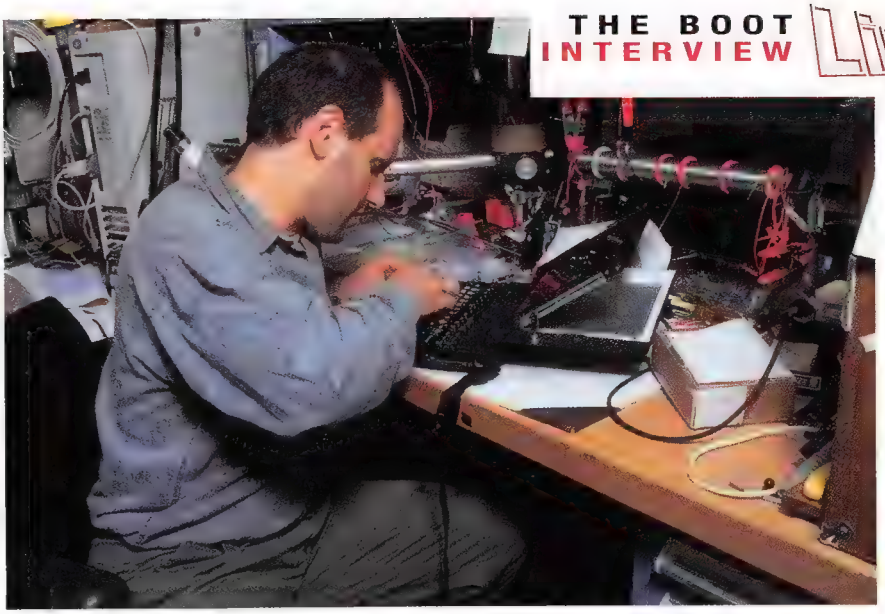


The Almaden lab is the source of "one or two" great ideas every week, but only five percent ever go public.

are the only technique people are using in GUI. Why aren't they using the other six? And what is it about 3D that is so cool?

Is 3D even necessary?

People have always been good at navigating physical spaces. It helps with priorities. So there are lots of techniques we can use to make information more real. I also believe the world can become a big cluttered mess, and you need cognitive prosthetics to have a shared knowledge—especially where you don't have everything you think about together in front of you at all times. How you communicate a shared background is going to be part of designing the user interface of the future. In a personal relationship, you rely on that.

boot: What role can machines play in personal relationships?

SELKER: There's still tension between concentration and socialization. You are in a social situation. What kind of tools do you want to support that interaction? I mean, if you're really excited about that person, you want nothing to come between you. Hopefully the sheets are gone, and the clothes are gone, but not everything can be done naked in the bed.

"I think it is a tough balance to be fascinated with machines without forgetting your religion... My religion is being interested in other people."

I was walking down the street in New York with friends of mine from NYU and Columbia, and we went into one of these cybercafes. My friend was able to show me his home page, and guess what? It turns out that this is incredibly lovely, because he can show me everything about himself in living, breathing color. So computers are now serving a really different purpose than before. Now I can send a telepresence, where in the past people had to really go and visit you.

boot: Well, with all these powerful abstract ideas, do you ever find yourself pressured to just settle down and make commercial products?

SELKER: No pressure. [Smiles]

boot: So, this is a "pure" think tank ?

SELKER: Well, all of the research community has been under tremendous pressure from everyone, from the government to all the companies that are cutting research funding. So...

boot: Is this process selling out long-term benefits for short-term rewards?

SELKER: [Shakes his head] I think it is just terrible and should be stopped. IBM now has more physicists than most large universities... but I think it's important for IBM to have a strong research team, in order to develop a strong leadership in science.

boot: Will you be with IBM forever? Is this your stopping point?

SELKER: That's a hard decision. I remember sitting at Xerox PARC and my boss saying "Why are you leaving?" I said, "Because if I was at IBM, my pointing device would sell on millions of keyboards. And if I was at Xerox, it's unclear even how our pointing device would sell." Xerox works hard and typically brings things out first. But IBM is in a position to have a high impact and I want to have an impact.

I should be publishing more and I should take more time to make sure people understand my ideas. As a user interface scientist, I usually grow things and put them on a shelf. Science, in my view, is having an idea that makes other people have ideas. If people reference your product, that is good. But if people don't remember what it is they are referencing, then it's not science. Science is the record of ideas aggregating other ideas.

boot: Ultimately your role is not necessarily to build a better computer, but to advance how people communicate with their machines.

SELKER: Exactly. I'm not the type of guy who would be proud to say, "I invented the microprocessor." What is the microprocessor actually used for? Was it good or was it bad to invent it? When I create something with a purpose, *then* I feel it was something worth making.

boot: Do you think any of your inventions will ever be used for evil?

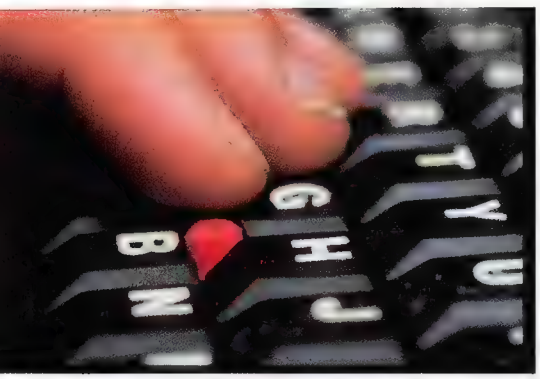
SELKER: Well, certainly someone is using the TrackPoint right now to avoid paying taxes or funnel their money to the wrong candidate [laughs]. I mean, what is "evil?" Sure I have moral dilemmas.

boot: Are you ever afraid someday you'll be looked back on as the "TrackPoint man"?

SELKER: I hope not. I hope I create lots of things. Keyboards have stood the test of time and have been pretty popular for 100 years, but that could change. As it changes, the value of the TrackPoint might change also. But I am very proud of the TrackPoint.

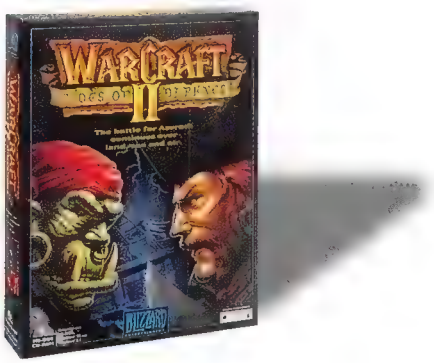
boot: With all your achievements, which idea are you most proud of?

SELKER: I always thought of this pointing device as a science fair project to keep me busy while I worked on my agent stuff. However, I worked very, very hard for 10 years on the TrackPoint and have sold millions of them, and I'm proud of that. And I'm also proud of those ideas I have that are way out there, but for entirely different reasons.



Selker brought his TrackPoint device to IBM so it could make an impact.

Game of the Year.



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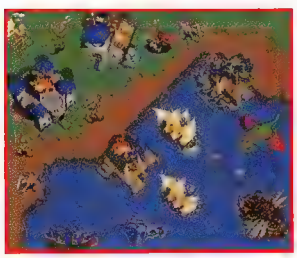

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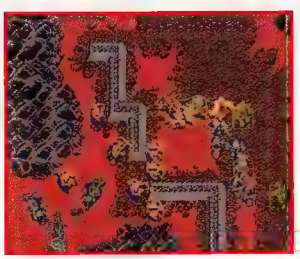

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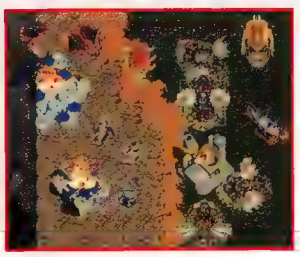

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yes! You can make your very own multimedia manifestos!

BY TIM TULLY

Maybe multimedia seems like an unreachable pinnacle, something that requires a studio full of white lab coats to pull off. The reality is that today, almost everyone can create some sort of multimedia presentation and at one time or another most everyone thinks about just that. An explanation of your perpetual motion theory to load onto a floppy and mail to all the think tanks, an animated family history complete with period music, digitized daguerreotypes, and voice-over correspondence that lives on your hard drive, or maybe the full-blown epic adventure of a man, a motorcycle, and a modem in a quest for truth that fills the entire Jaz cartridge. And while it's still a complex task, the state of the art is such that most of those everyones can fulfill that wish. Heck. If you get ambitious, burn the thing to a CD-R.

For all its complexities, the basic multimedia presentation consists of only five elements: text, audio, video, graphics, and what has come to be called "authoring." While each of these categories contains a world of subcategories, trials, techniques, and other considerations, it helps to have an overview.

Plan Ahead

There is no way to overemphasize the need to plan ahead and no set way to tell the first timer exactly how to do this. Every project evolves differently, but the more you can outline, script, storyboard, and just plain visualize every detail of your project, the better the final product will be. Guaranteed. Multimedia is complex enough that the masterpiece created on the fly is rare. That being said, also be prepared to deviate from the plan as the project evolves. Creative ventures are dynamic and given to unforeseen opportunities and hindrances. Make like a Boy Scout and be prepared.

Massive demo versions of nearly all the software tools mentioned in this article can be found on the *bootDisc* bundled with this magazine. Look for the above icon for more info about the specific products mentioned in the story.

Make Multimedia MANIFESTOS

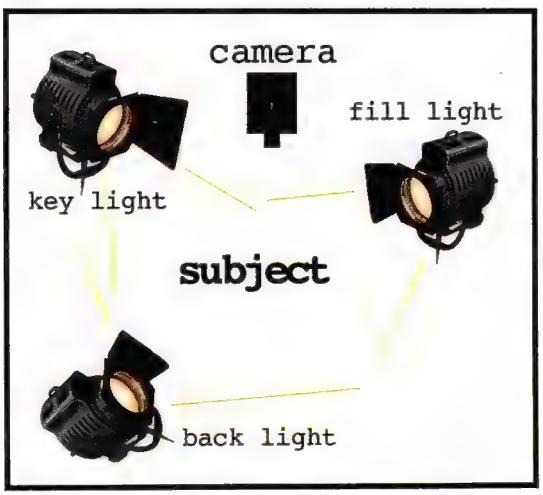
The Written Word

Text is the medium people are most familiar with. Whether you generate your text on a PC, a Mac, or even your old Amiga, generic text files will import and export between documents. But your formatting may not survive these platform and application changes. In a simple presentation, text can come from your friendly word processor (take advantage of your trusty spell check utility whenever possible), but text for a graphic or video, which tends to be shorter in length, should be produced within the graphics program or video editor.

The Lights and Action

Today's Pentium-based PCs deliver the performance needed for quality video playback, so digital video is more popular than ever for multimedia productions. Video can be dubbed from existing footage or transferred from film, but will usually be nabbed directly from the camcorder. Shooting quality video can be tricky at first, and even the simplest "talking head" can be embarrassing if shot badly. Hiring a pro might be an option for some, but if you must be your own cinematographer, observe these basics:

A basic three-light setup for shooting video



- Always use the highest quality camera and tape format you can afford. The Hi-8 format delivers professional quality at affordable prices. Once shot, the raw video will go through a series of technical compromises; and the better the initial quality, the better the final product.

- Shoot in bright, but not harsh, natural light whenever possible. Open shade is a good choice, but watch out for the blue cast that accompanies it. If you're working indoors, a large window off-camera can create good softbox-style lighting effects, or you can rent a basic, three-light professional system. With a talking head, this is set up as a strong floodlight on the front of the subject (the key light), a softer, diffused light (the fill light) to one side, and a backlight above and behind the subject, highlighting the hair to break the subject off the background. (See the lighting diagram below.)

- Keep backgrounds simple. Clean backgrounds are devoid of distracting clutter. Consider going monochromatic behind the subject, but avoid flat surfaces such as walls that give no perception of depth. Keeping the background out of focus is another good technique for keeping the subject the center of attention.

- Avoid gimmicky tilts, pans, or zooms. They never look as fun in playback as they were to shoot.

- Keep your subject framed as tightly as possible without making the screen look cramped or cutting off important information or appendages.

- Beware of sudden swift motions that might fall out during playback. Video still challenges many of the lesser PCs that might run your project.

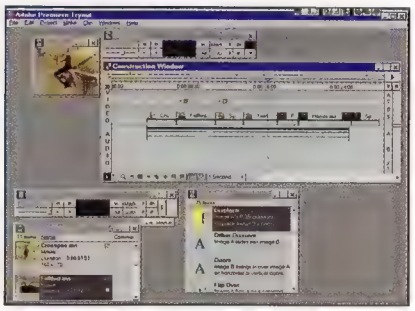
A simple primer about traditional film editing can help your video shooting tremendously. Experiment with all these elements, and shoot as much footage as you can. You don't want to come up short in the middle of your editing session when the talent has gone home and you've returned the lights to the video store. Tape is cheap.

Digitizing Your Video

Once shot, video must be digitized by the computer. Many different makes of video capture cards do the job, but look for the highest frame capture rate (30fps, if possible) and compatibility with Microsoft's Video for Windows format.

A capture card not only digitizes the video information, it also compresses your footage, typically in the Motion-JPEG format. Compression is an absolute necessity, because digitized video generates a godawful lot of data: One second of uncompressed, full-screen video consumes 27MB, and neither your hard disk nor your data bus can continuously stream 27MB/sec. Digitizing is time consuming (longer than real-time playback), so the time to review your raw footage and decide what you'll use is before digitizing.

One decision you'll want to make early on regards capture quality. The limitations on the speed and compression capability of your card, and the speed of your hard drive, CPU and data bus, will play a factor in this choice. And if you plan on sharing your presentation, you'll need to consider the specs of other machines it may run on and accommodate their limitations by further compromising quality. Your final deliverable may only play at 15fps or less. So, while full-screen video is usually 640x480, your footage may have to be quarter screen (320x240). Other performance/quality trade-offs are color depth and whether you capture two video fields per frame or just one. In any case, experiment with all these variables to determine which trade-offs you're willing to make. In general, it's best to capture at the frame size you'll wind up using and at the highest frame rate possible.



Premiere **allows you to drag and drop your files into a timeline for instant playback and editing.**

Editing the Video

Video editing is the process of stringing together portions of your raw footage in an order that best communicates the message or creates the effect intended. This includes determining the "in" and "out" points of your clips, applying different types and durations of transitions between those

clips, adding any on-screen text (or "titling" as it's called in video), adding any special effects, and mixing the audio. Adobe *Premiere*, the most popular video editing application, is a professional tool that performs all these editing functions, yet is straightforward enough to allow anyone to jump in and experiment. Like other video editors, *Premiere* imports video clips, audio not recorded on-camera, and still or animated computer graphics. You can also import or create text and build sophisticated special effects. Once all your material is imported, Premiere allows you to drag and drop the various elements onto a "timeline." Editing is where the action is. You get to make creative judgments, assemble all the elements, and watch the video come together under your hands. Enjoy this moment.

Output

Compression for output can be the trickiest step and requires the most trial and error to preserve the delicate balance between quality and performance. "But I already compressed my video when I captured it." Correct. But for your video to play without special hardware assistance, the final clip must be compressed again with a compressor/decompressor algorithm ("codec"). Many are available and each has its own strengths and weaknesses. At this point, you also have to decide the format in which to save your video. Many formats and codecs are available within *Premiere*, and the manual offers more in-depth direction for both decisions. Experimentation is definitely the order of the day. As a starting point, I recommend using either AVI or QuickTime for Windows file formats, and either the Cinepak or Indeo compression codecs.

You can mix movies, graphics, and sound files with Adobe *Premiere 4.2*. You'll find a demo version on the *bootDisc*.

The Dimension of Sound

Whether you intend to use sound recorded directly onto the videotape, creating a higher-quality version of the audio on a dedicated recorder, recording additional background sound and sound effects, or producing a musical score, you will follow the same path for audio as you did for video: capture (or compose), digitize, edit, and output.

There are two essential technologies for sound: digital audio recording and MIDI. Digital audio is analogous to recording sound on tape: any sound can be digitized onto a hard disk, edited, and played back. The MIDI language lets computers communicate with hardware or software synthesizers and other electronic musical instruments. We'll look at both.

Digital Audio

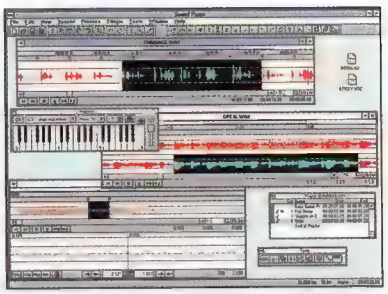
The same garbage-in/garbage-out rule outlined for video applies to audio. Use the best microphone, tape, and deck you can afford. If you haven't thrown away the cheesy mic that came with your sound card yet, do so immediately. Even the lowest-priced ($30 to $100) RadioShack mic is light-years better than those bundled horrors, and if you can afford a $250 to $500 basic, omnidirectional dynamic mic from manufacturers such as AKG, Beyerdynamic, Shure, or Audio-Technica, do it. If you're recording audio directly to the videotape, simply connecting an external mic to the camcorder will give you a significant edge, eliminating the camera motor noise built-in mics pick up. For better quality, or for sound not intended for video, record to a good DAT deck or even a high-quality analog cassette recorder.

If you haven't thrown away the **cheesy mic** that came with your **sound** yet, do so immediately.

DAT data can be directly transferred to your computer if it has an audio card equipped with digital audio inputs (AES/EBU is the professional format and uses XLR cable connectors; S/PDIF is the consumer format and using RCA connectors.) Analog audio has to be digitized and saved to disk, just like video. The sound cards bundled with PCs have anything from terrible to tolerable analog-to-digital converters (ADCs), but the inexpensive CardD Plus from Digital Audio Labs has good analog and digital inputs.

If you're working with sound recorded with the video footage, Premiere will display that sound as two stereo tracks which you can cut, copy and paste, change volume, trim in and out points, but little more. This should suffice for most, but if you have additional sounds, want more control of the sound, or want to import your sound directly into the authoring application, you need a dedicated audio editing application.

If you have a lot of discreet audio sources (narration, music, sound effects, dialogue) the multitrack editor *SAW Plus*, from Innovative Quality Software, is the ticket. It will record or import, and edit up to 16 independent mono or stereo tracks on as many as four sound cards. It displays each piece of digital audio much like *Premiere*, but with greater visual detail, and the editing tools offer greater precision and control. Automated level and pan changes, DSP effects such as vari-speed, reverse, equalization, and delay are only a few of its many functions. It reads many file formats, has a friendly and intelligent interface, and basically gives you a small recording studio in a computer.



Before importing your digitized audio samples into an editing application, such as *Sound Forge*, be sure to capture the source audio at the highest fidelity possible.

While *SAW Plus* is maximized for mixing many complex tracks, Sonic Foundry's *Sound Forge* offers sophisticated fine tuning of stereo tracks. While *SAW Plus* plays different parts of multiple sound files from disk in whatever order you wish, leaving the

Pressed For Time

You'll also want to constrain the playback data rate when you output your final video. Why? Consider the aforementioned 27MB/sec data rate of raw video. Depending on its speed, a CD-ROM drive can pump out between 90K/sec and 900K/sec (which is a real world fraction of its theoretical potential).

DRIVE	DATA
single speed	90K/sec.
2X	150K/sec. to 200K/sec
4X	300K/sec. to 450K/sec
6X	450K/sec. to 600K/sec
8X	600K/sec. to 900K/sec

Make Multimedia
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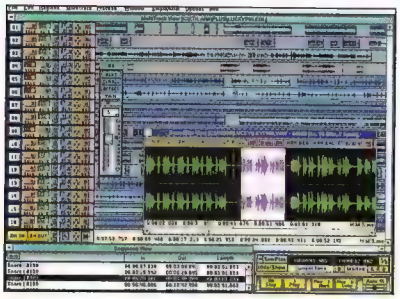
original files undisturbed, edits in *Sound Forge* are destructive: they physically change the RAM file that eventually overwrites the one saved to disk. But no Windows application provides deeper or more numerous ways to edit a two-track file, and version 4.0 will let you transfer audio directly from a CD to your hard disk and perform extensive digital signal processing.



With *SAW Plus*, you can record, import, and edit up to 16 tracks on four sound cards.

Before you combine all your narration, dialogue, music, and sound effects into a single stereo WAV file, you have to pay the bandwidth tax again. It's best to record, edit and process your audio in 16-bit/44.1kHz format, but you almost never get to keep it that way. The space and playback bandwidth limitations that constrain video apply to sound as well, and even professional producers often end up turning stereo into mono, cutting resolution to 8-bit and dropping sample rates to 22K, 11K, or even 7.5K. If you've ever wondered why multimedia sounds so bad, just contemplate the difference between your latest 16/44 stereo CD and the 8-bit, 11kHz, mono track on that last CD-ROM game you bought.

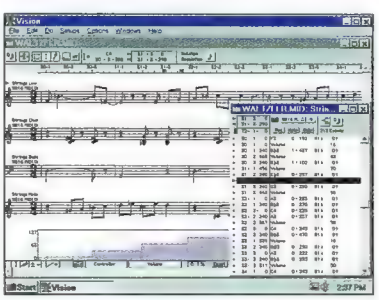
For the best quality, especially when forced to sell size for performance, use the normalize function in your audio editor (such as L1, a *Sound Forge* plug-in from Waves) to digitally increase the lower levels while preventing the louder ones from distorting. This reduces the scratchy, hissy noise that occurs in 8-bit audio files.

Try your hand at sound-editing with the annotated version of Innovative Quality Software's *SAW Plus* and Sonic Foundry's *Sound Forge*, located on the *bootDisc*.

MIDI

With MIDI, there is good and bad news. The good news is MIDI files require ridiculously little disk space and bandwidth for even the most complex musical scores. The bad news is that a quality synthesizer is required to play solid timbres. The good news is the wavetable synthesizers on today's high-end PC sound cards perform leagues better than those from just two years ago (inexpensive devices such as Roland's Sound Canvas deliver fairly satisfying music), and there are promising advances taking place with software synthesizers. Yet—and despite the ubiquitous use of MIDI in professional music—you can't rely on the quality of any given sound card in any given PC. So, when the playback machine is under your control or for noncritical music, MIDI is great. Otherwise, go with digital audio.

But why is MIDI so great? Glad you asked. MIDI lets you hook a keyboard to your computer, and play one performance after another, building up essentially any kind of music conceivable, using sounds that convincingly emulate traditional instruments or have unique electronic timbres. While a certain talent, skill, and knowledge is required to take advantage of this technology, MIDI sequencers can overcome an individual's musical shortcomings. If you're interested in producing your own music for a multimedia presentation, try a sound card from Ensoniq or Yamaha. Along with a MIDI sequencer, such as Twelve Tone Systems' *Cakewalk Pro* or Opcode Systems' *Vision* (see the review on page106), you'll have the tools to become the next Brian Eno.



If you need to fine tune your audio mixes to decrease noise levels, Sonic Foundry's *Sound Forge* is an excellent choice.

Sound Theory

Digitized sound has two primary technical characteristics: bit resolution and sample rate. A computer digitizes sound by sampling its instantaneous level (i.e., volume) many times a second. It describes each of these levels in a digital word comprised of a specific number of bits. Professional audio, such as that on music CDs for example, is recorded with 44,100 samples per second, each sample being described in a 16-bit word. The quality achieved by 16-bit/44.1k audio is described in terms of its signal-to-noise ratio: i.e., the difference between the loudest sound that can be recorded without distortion and the level of noise in a file which has recorded only silence. Professional quality audio has a theoretical signal-to-noise ratio of 96dB. Where does the noise come from? Your tape deck, your disk drive, your CPU, your ADCs and whatever ungrounded circuits exist in your PC all make noise that loves to get into your sound files. Meticulous engineering is the only thing that will keep things quiet as possible, and that's why good sound cards cost money.

Graphics

After text, the most familiar medium, to most people is graphics. For simple illustrations, the *Paint* program bundled with Win 95 is a good basic tool. Another level up, the *CorelDraw* package adds many helpful functions and a slew of clip art and fonts. The ultimate tool is Adobe *Photoshop*, which not only offers professional draw and paint tools, but also acquires scanned photos and lets you modify them in nearly infinite and unimaginable ways. It also imports nearly every one of the multitudinous graphics file formats, and can save anything it imports as the universally accepted BMP format. Vector-based art, such as images created with paths in Adobe *Illustrator*, cannot be imported into most authoring programs without first being converted into a bitmap. Check the program you intend to compile all your components into to see what formats it imports. Again, size is a concern, but not as great as with sound or video, which stream through the processor. Like digital audio, computer images look better when they're bigger. A 24-bit graphics file can contain millions of colors, looks great, and results in a

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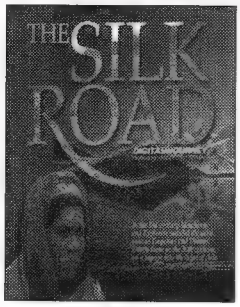


DNA Multimedia

Study the people, history, languages, religions and explorers of this ancient trade route as you journey over its high steppes and hot deserts.

[PC: WIN 3.1 or WIN 95; 486; 4mb]
[MAC: Sys 7.0; 68030; 2.5mb]
Hybrid: works on PC and MAC systems

Vendor Price: $49.95

Borders Price: $34.95

IVI Publishing

From the world-renowned medical facility comes a special two-CD package, featuring both a newly updated health guide and a pharmacy/first aid reference.

[PC: WIN 3.1 or DOS 5.0; 486sx; 8mb]

Vendor Price: $49.95

Borders Price: $37.95

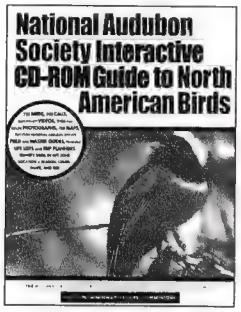
Fox Interactive

Examine the production stills and electronic storyboards and meet the stars, creators and special effects teams behind this summer's most anticipated motion picture.

[PC: WIN 3.1 or WIN 95; 486; 8mb]
[MAC: Sys 7.1; 68040; 5mb]
Hybrid: works on PC and MAC systems

Vendor Price: $29.95

Borders Price: $19.95



Knopf New Media

This richly visual multimedia experience provides all the resources you'll need to familiarize yourself with sights and sounds of 723 North American birds.

[PC: WIN 3.1 or WIN 95 or DOS 5; 386dx; 8mb]
[MAC: Sys 7.0; 68030; 5mb]
Hybrid: works on PC and MAC systems

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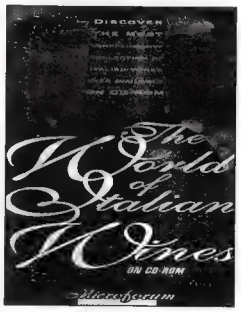


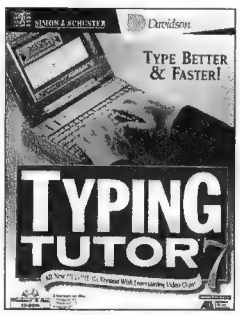
Microforum

An ideal reference for wine lovers and travelers alike, The World of Italian Wines brings the history and tradition of Italy's great wine regions into your home.

[PC: WIN 3.1 or WIN 95; 486dx; 4mb]

Vendor Price: $39.95

Borders Price: $24.95



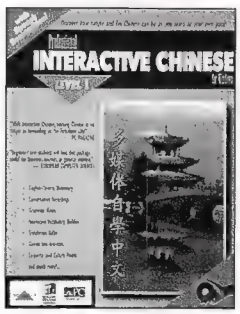
Simon & Schuster Interactive

This new version of the popular typing program evaluates your strengths and weaknesses at the keyboard, then creates customized lessons based on your abilities.

[PC: WIN 3.1 or WIN 95; 486; 8mb]
[MAC: Sys 7.0; 68040; 8mb]
Hybrid: works on PC and MAC systems

Vendor Price: $49.95

Borders Price: $29.95



VentureTech

Thirty comprehensive lessons complemented by speech recognition technology are combined in a unique instructional package that's ideal for business people.

[PC: WIN 3.1; 386; 8mb]

Vendor Price: $199.95

Borders Price: $124.95

Penthouse Interactive

In this provocative version of the Hindu treatise, you enter the East Indian Temple of Love seeking enlightenment and instruction in the 64 arts of love-making.

[PC: WIN 3.1; 386; 4mb]
[MAC: Sys 6.0; 68030; 5mb]
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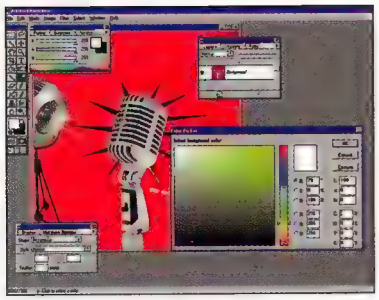


When it comes to editing and touching up still images, no tool is more powerful than Adobe *Photoshop*.

huge file. For data flow reasons, most images in multimedia are jammed into 8-bit words, and usually require tweaking to be satisfactory. Since a graphic usually only loads once, the concern is primarily with the initial delay. With a massive color palette and unruly resolution and dimensions, this can add up. While many authoring programs allow you to reduce oversize artwork to fit a frame, avoid this option whenever possible. It just congests matters unnecessarily. Stick to screen resolutions and reasonable dimensions (usually no more than 640x480). Some graphics formats, such as GIF and JPEG include compression schemes that can speed load times if the algorithm is more efficient than the bulk it replaces. Experiment with your files before you decide. Use *Photoshop* to create or edit any kind of image and—especially with its wide range of plug-ins—distort, filter, and otherwise process an image in a fantastic number of ways. The graphics and illustrations you develop in *Photoshop*, or any of these programs, will be imported into either your video editor or multimedia authoring program.

A series of images, each different in some small way from the next, can be displayed sequentially by the video or authoring program to create a simple animated character, element, logo, or chart.

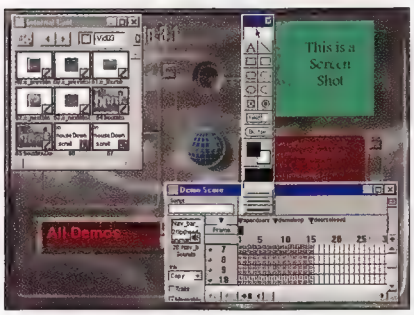
Authoring

Once you have captured, created, edited, and processed all the text, video, audio, music, and still images you want in your multimedia presentation, you're ready to knit them all together with an authoring program. These come in all sizes and flavors, from simple presentation software such as Microsoft's *PowerPoint*, to capable solutions such as Strata's *MediaForge*, to daunting (yet powerful) proposals such as *Visual Basic* from Microsoft.

Since its arrival, it's been criticized, excoriated, challenged, and sworn at as often as it is sworn by, yet MacroMedia *Director* is still the most widely used and generally capable authoring program.

On a theoretical level, *Director* is simple. Like *Premiere*, it uses a timeline into which you place the elements. But *Director* accepts all media: sound tracks (up to eight), MIDI sequences, QuickTime or AVI movies, pages of text, and graphic images. It also has its own programming language, Lingo, which more advanced users can use to write code that performs a multitude of functions, from interactive animations to dynamic database access. This combination of graphic interface and programmability gives *Director* enough power for even the most ambitious projects. Perennial bestseller *Myst* typifies the caliber of project that can be created in *Director*, but projects as diverse as Voyager's documentary discs and Discovery Channel's FMV-based *Connections* also illustrate the tool's capabilities.

To use *Director*, import your media elements into a new project, where they are logged as Cast Members. From there, drag elements onto any point on the Timeline (you can do so any number of times in different locations) and position it on the Stage, a screen which you can set to any size that serves as the canvas for your project. Once in the Timeline, the starting and stopping time of each element can be edited by simple click-and-drag techniques. Rudimentary actions, such as buttons that take you to a different screen or activate a sound or video clip, can be assigned. This editing is all nondestructive, like that in *SAW Plus*, and only affects the playback, not the media file itself. To see what you have assembled, just play it back on the Stage.

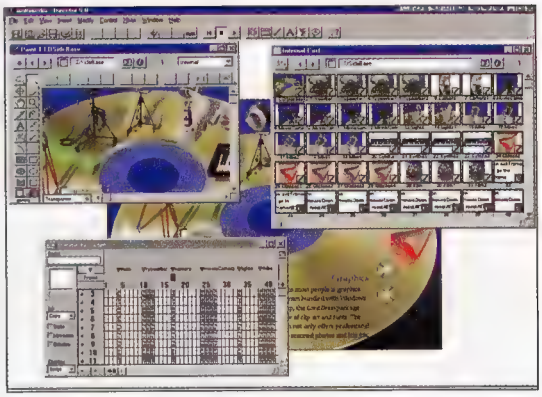


Criticized as often as it's praised, *Director* is still the authoring program of choice.

Make Multi media

MANIFESTOS

Director's multiple tracks let you keep lots of plates spinning at once. It can simultaneously play both MIDI and audio (for narrative with a music background, for example), it can put up a still graphic to serve as a background, play a movie in front of that, or animate it by playing altered versions of it.



Macromedia *Director* accepts all media and includes its own programming language, Lingo, which allows you to create more advanced animations and presentations.

Like *Photoshop*, *Director* is deep in features and functions, but boasts an interface that lets you get started without too much pain—a combination of both immediate and deferred gratification that's hard to beat.

Wrap

Making multimedia requires time. Making good multimedia consumes your time, talent, attention, and hard work. Still, once the bug bites, even calamine lotion won't help.

Minimize the itching by arming yourself with the fastest system, largest disk, and most RAM you can afford. But still, build your presentation so people with lesser systems can play it smoothly and consistently. Don't bang your head too hard on the limitations of speed and bandwidth imposed by the current hardware. They will disappear in time, and remember: Limitations can be the genesis of great art, and clever work-arounds are often more interesting and pleasing than the original idea.

A demo version of the authoring app *Director 5.0* by Macromedia can be found on this month's bootDisc.

Peanut butter and jelly? **Good idea.**

Peanut butter and chocolate? **Better idea.**

TELEVISION and the PER

SONAL COMPUTER?

by Bryan Del Rizzo

Hmm... The first decision new PC owners must make is where to set up the computer. Living room? No table to work on and too much distraction from television. Bedroom? Spouse thinks night is better spent sleeping than prowling around in the MUDs. Bathroom? Tempting, but electrical appliances and water just don't mix. So unless you have a spare room or den/study/basement to devote to the machine, you're screwed. Maybe someday, in a Jetsonian future, we'll construct houses with a dedicated PC room (or maybe we'll just build the PC into the house alongside the water heater, with I/O jacks scattered about the house like electrical outlets).

In the meantime, we find ourselves back in the living room. Nice big room. Usually dedicated to entertainment. There's the 31-inch TV with cable, VCR, and game console. The stereo system is over there, with its towering speakers and CD jukebox. Everything within reach of the remote control. Now, where to put the PC with its video/TV tuner card, 3D-graphics accelerator, 17-inch monitor, multimedia speakers, and CD-ROM drive? Hold on a minute... There's a whole lotta redundancy goin' on here. You could buy an NTSC scanline converter and some RCA cables and plug the PC into these existing appliances, but plugging a motherboard into the entertainment system might make more sense. Why buy a small sharp CRT and a big soft CRT? Why buy a audio-only CD carousel and a versatile single-disc CD-ROM drive? Why buy top-of-the-line speakers for the TV, the stereo, and the PC?

Find a need and fill it

Somewhere, someone came up with the idea that the biggest problem with the PC was the room it was located in. "If only the computer were in the living room, it would be so much friendlier," our genius figured. "Considering that more than 95 percent of all U.S. households own a television, but only about one third of them own a personal computer, a box that combines the functionality of both devices would be an instant hit."

It seems that the consumer electronics industry has been listening to our pied piper, because a number of companies—including Hitachi, Sega, RCA, and Mitsubishi—have recently announced products designed to merge the PC with the boob tube. These TV/PCs are designed to merge television's capacity for entertainment with the PC's productivity, education, entertainment, and Internet-browsing capabilities. But does anyone really want this technology?

The Consumer Electronics Manufacturers Association (CEMA) believes there is a ready market. The trade group recently published a study indicating that 49 percent of adults surveyed expressed interest in purchasing a TV/PC. Gateway 2000 product manager Stacy Hand says Gateway's Destination system, one of the first products of its kind, is based on extensive consumer studies conducted to determine what people want in a TV/PC.

NetTV, another early player, based its decision to market its WorldVision system not on surveys or consumer focus groups, but after talking to retailers who insist that this is a market waiting to happen.

Both Gateway and NetTV stress that these products are not meant to replace the desktop machine. The CEMA report, however, indicates that consumers who would consider buying a TV/PC would prefer to set it up in the office or den—where a desktop PC would typically be used—and not the living room, family room, or bedroom. People might have higher expectations for these machines than either Gateway or NetTV are willing to acknowledge.

Caveat empty promises

Before you break into a cold sweat as visions of Quake leaping from your puny 17-inch monitor to a mighty 37-inch TV screen dance in your head, remember mom's advice: Bigger is not always better. Your mild mannered monitor has a much finer dot pitch than your traditional TV screen (.26mm versus .75mm and beyond), so those beautifully rendered walls are going to be much less sharp on the big screen. Depending on the application, images can be fuzzy and text can become impossible to read. It's hard to wax enthusiastic about word processing and spreadsheets, even on the big screen. Numbers and words, after all, are just numbers and words, no matter how big they look. But when you're finished playing games, you're going to want to work—or at least cruise the Net.

Intel is pushing this convergence heavily, with the stated intention of boosting sales of its processors. Intel's Intercast Technology is one of the company's flashiest and most ingenious tools. It allows television broadcasters to embed computer-readable text, graphics, and data (in HTML format) within the blanking interval of a television signal. A computer (or a TV/PC) with the appropriate TV tuner/Intercast decoder can display related content from a Web site. Intercast is fast because it's not coming through the narrow pipeline of your phone line, but via your back-channel connection (so you can follow whatever links the Intercast pages present). However, it will only be as fast as your modem and phone line.

You can display Web pages alongside a live TV video window using the WinCast/TV PCI card and Intel's Intercast Web browser.

Over the summer, NBC supplemented its 70 hours of Olympics coverage with data such as athletes' biographies and historical statistics. CNN is also using the service to supplement its 24-hour news coverage, and the MTV Network's M2: Music Television channel is using Intercast to provide viewers with information such as concert dates and background information about artists. MTV says it's working with Intel to develop other applications as well.

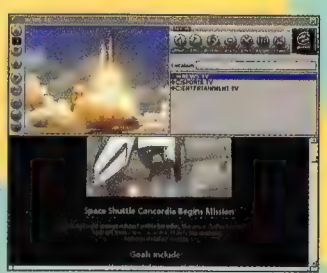
On the hardware side, Compaq is test-marketing Intercast-capable Presarios at Atlanta CompUSA stores; Hauppauge is marketing its $149 WinCast/TV tuner/Intercast decoder card; and Gateway 2000 is building an Intercast-capable video card into its Destination system (although the company isn't promoting the feature or even providing software support until Intercast broadcasts become more common). The big question, of course, is does anyone really want this technology? According to a recent IntelliQuest study, only 8 percent of the 35 million people who went online during the first three months of 1996 spent more than 20 hours a week there; more than 40 percent of those people spent less than two hours a week online. Supply and demand, anyone?

Gateway's Destination systems—the result of extensive consumer studies—include a Pentium based computer, 31-inch monitor, and a video/TV tuner card.

What's available

Speaking of supply and demand, while hundreds of manufacturers build PCs, only two companies are shipping living room PCs. Gateway 2000 had suspended shipping its Destination system because of customer complaints related to the video/TV tuner card, the wireless keyboard, and its remote control devices. They resumed shipping after making changes to these components.

A high-end Destination ($3,899) consists of a 166MHz Pentium, 256K of pipeline burst cache, 16MB of EDO DRAM, graphics adapter with TV tuner and 2MB of VRAM, 2GB EIDE hard-disk drive, 8x CD-ROM drive, 28.8Kbps fax/modem, and a wavetable sound card. Gateway uses RF technology to eliminate the wiring for its keyboard and mouse. The system doesn't include speakers, but Gateway offers custom Harmon/Kardon speakers for $699. As with other Gateway products, you can custom configure a Destination to your specifications.



A sample screen using Intel's Intercast Technology showing a live video feed from CNN with a Web browsing interface.

The most important component in the system, however, is the massive, non-interlaced 31-inch VGA monitor. The Destination monitor supports a maximum refresh rate of 72Hz, but its maximum resolution is only 800x600 and its dot pitch is .88mm (a staggering number when you're accustomed to a tube with a dot pitch of .28mm or less). Since Gateway only sells direct, you won't really know how the system looks until it's sitting in your living room.

NetTV's WorldVision is the only other living room PC now on the market. WorldVision systems consist of a Pentium processor (120MHz to 166MHz), 256K of pipeline burst cache, 16MHz to 32MB of

Bad To The Drone!

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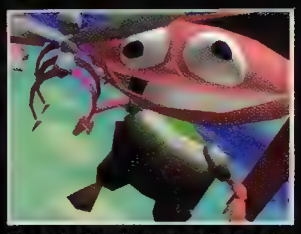
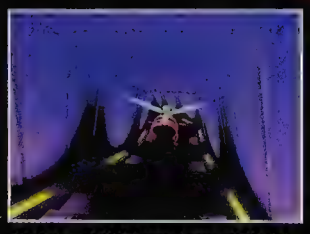
A Flight-Sim for Novices and Aces Alike

Beneath the animated, exoskeleton of Banzai Bug beats the heart of a joystick-wrenching, pheromone-pumping, action-packed flight-sim. Designed for all of you gamers with better things to do than memorize a tech manual the size of a calculus book, Banzai Bug weaves a humorous story-line and wise-cracking dialogue seamlessly into the aerial action. Lead Banzai on a mission to drive the bug-phobic humans out of the house forever. Banzai Bug will be flying off your local software retailer's shelf beginning this October.

Eight fully rendered 3D levels



Bug-phobic human adversaries



3 Axis, 360° freedom of flight

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GRAVITY

Banzai Bug! is a trademark of Grolier Interactive Inc.

70ns DRAM, EIDE hard drive (1.0GB to 1.6GB), 8x CD-ROM, and 28.8Kbps fax/modem. Video is handled by a Cirrus Logic 5440 chipset with 1MB of DRAM and a TV tuner. (NetTV plans to switch to an S3 ViRGE-based card soon.)

NetTV offers a range of monitor sizes, from 29 inches to 37 inches. Each has a maximum resolution of 1024x768 and a dot pitch of .75mm. The monitor has a pair of small 3x5-inch self-powered speakers (6 watts per channel) built into its bezel.

NetTV's WorldVision systems range from $3,000 to $6,000 and include high-end components such as 37-inch computer monitor/television screens.

NetTV went with IR technology for its wireless keyboard/trackball, which could cause line-of-sight problems if you have kids or pets running around the room.

At press time, WorldVision systems (which range in price from $3,000 to $6,000) were available only at Fry's Electronics stores in California, but NetTV was negotiating national distribution deals with CompUSA and Computer City.

Who's in control?

At the core of the entire evolution of this new breed of hardware lies several contradictions.

Personal computers are intended for interactive media and designed to be used by one person at a time; television delivers passive media to a group.

Most existing multiplayer PC games are set up for play using several computers linked via modem or LAN. Merging computers and TVs doesn't mean that television will be instantly rendered interactive—it's not that simple. So where does the benefit of such a merger come into play? The answer probably lies in some future technology. This presents a classic chicken-or-the-egg conundrum: No one wants to develop content for a platform that doesn't exist, and no one wants to buy a new platform that doesn't offer any content.

Put a PC in the heart of your home entertainment system and you have to decide who's going to be in charge of the thing. Who decides whether it's going to be a TV or a computer tonight? Is the CD-ROM drive going to play the new Sting CD-ROM or *Dark Forces*? Watching someone else channel surf can be a nerve wracking experience; sitting idly while someone else Net surfs is enough to drive a saint to hell.

Technologies such as Intercast might eventually create a viable market for "smart" TVs, some games would be enhanced when played on a big-screen monitor, and television would certainly look better in high res mode, but imagine using your TV to design a Web page or model and animate a complex 3D object. Living room PCs may eventually earn their keep, but they'll probably never replace the desktop PC. b

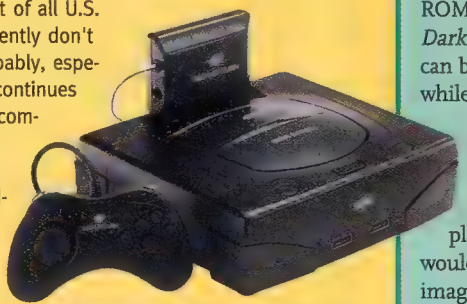
Internet Idiot Boxes

With visions of dollar signs dancing in their heads, many companies have been looking for a way to hook new consumers, and have pounced upon the Internet and TV/PC products as the solution. But unlike the products from Gateway 2000 and Net TV, many of these so-called TV/PC hybrids are only TV/Internet solutions-and not full-fledged computer systems. Still, many companies are hoping the allure of the Internet will be too strong to resist.

For console gaming fans, Sega is releasing the Saturn Net Link allowing users to access the web, retrieve e-mail and play internet games (against Saturn or PC users), for less than $500 (including the cost of the core gaming system). For television viewers, JCC's iBox includes a modem, CD-ROM and its own little CPU enabling you to access the web and e-mail from the confines of your living room. And not to be outdone, Sony and Philips have announced WebTVs allowing you to access the Internet through a set-top box on top of your television.

You can easily tap into the Internet, send e-mail messages, and browse Web sites with JCC's iBox featuring a 28.8Kbps modem, CD-ROM drive, and 8MB of memory.

With the majority of U.S. households earning less than $40,000 per year, many studies indicate that sales of PCs to home consumers may have already reached its saturation point. So will these low cost solutions be of interest to the more than 70 percent of all U.S. households who currently don't own computers? Probably, especially if the Internet continues on its path of gross commercialization. But although these solutions are more affordable and less intimidating than a PC, one fact does remain. They are not to be confused with the real thing.



Sega's NetLink is a Web browser for the Sega Saturn. Saturn users will alos be able to play Internet games against PC users.

"Can I Get Higher Performance?"

"...Cyrix 6x86™ systems achieve fastest Winstone scores ever."

– PC Magazine Labs Online, February 21, 1996

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When it comes to your computer, performance is all that counts. Top-notch, record-breaking performance. With the latest Cyrix 6x86 processors, you get the only microprocessing engine that rockets beyond the 133, 150 and 166 MHz Pentium® processors. You get the Cyrix performance *plus*

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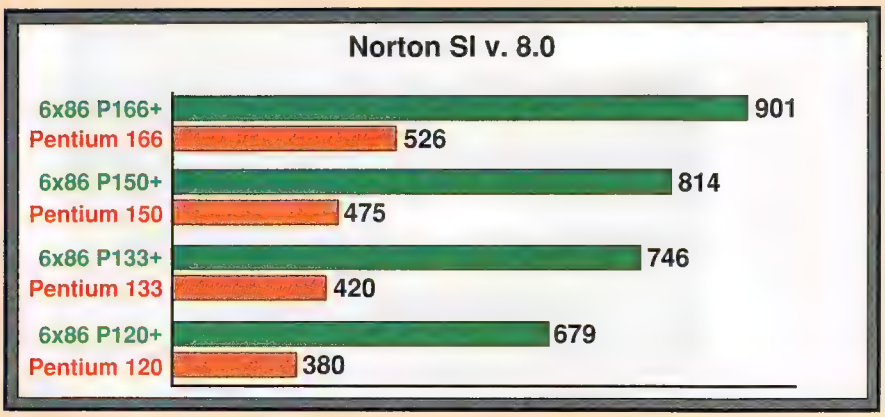

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Product Information Number 273

the boot 12-step program

DEALING WITH YOUR PC **OBSESSION** DAY TO DAY BY BREAKING IT DOWN INTO 12 **EASY** STEPS

this month:

How to successfully install a SCSI drive

You've heard all the promises: SCSI will make you more attractive to the opposite sex, SCSI can guarantee you win the state lottery, SCSI delivers faster performance than IDE, but still, you've never really wanted to deal with all the hassles associated with setting up a SCSI bus. Well, fret no more. It's actually not that difficult. And with *boot* at your side, you can do it in 12 easy steps.
– Bryan Del Rizzo

1 Scuzzy Defined

Before beginning, you'll want to know what the heck SCSI is. SCSI (Small Computer System Interface) is a standard methodology for daisy chaining up to seven peripheral devices—including hard drives, CD-ROM drives, and scanners—to a host computer (the SCSI 2 standard supports as many as 15 devices). The SCSI bus is faster than the traditional IDE bus, resulting in enhanced and faster performances. SCSI devices are also priced slightly higher than IDE devices. But keep in mind, you get what you pay for in this world.

2 You're Grounded

Before you start mucking around inside the computer, make sure you eliminate all possible static charges. If you possess any electrical superhero abilities (are you listening, Thor?), disable them before starting. Mere mortals need only touch the metal case, or ground themselves by wearing a grounding bracelet. It's a good idea to avoid working on your computer while sitting on the carpet or while rubbing your hair with a balloon or while shuffling your socks rapidly on the rug. Once discharged, unplug the power cord from the back of the PC, open and remove the case, making sure you keep all the screws you remove (you may want them for step 12).

3 Cream Filling

Locate an empty PCI slot. Look closely at the motherboard, PCI slots look like the filling in an Oreo cookie. In other words, PCI slots are usually white and shorter than the ISA or EISA slots, which are usually black. The PCI slot may be a shared slot in which you can insert either a PCI card or an ISA/EISA card. Remove the expansion slot cover from the back of the case and save the screw. Slide the SCSI adapter card firmly into the slot (don't force it!) so that the contacts are seated securely. Take the screw you just saved and secure the metal bracket on the adapter card.

4 Dock of the Bay

If you're installing an external SCSI device, skip to step six. If not, read on.

Locate an empty drive bay and remove the front cover. If your computer requires mounting rails to mount internal drives, attach the rails to the drive. Insert the drive into the open bay so that the drive is flush with the front of your computer. Secure the drive by tightening the screws.

5 Get Plugged In

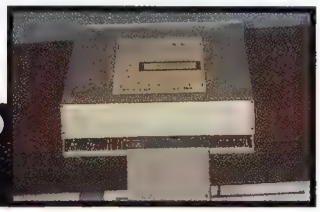
Connect the ribbon cable with the stripe running down the length of one side to the back of the drive. Match the striped side to markings on the back of the drive, or a PIN 1 label. Some cables have a special notch that helps ensure you do not plug the cable in backward. Connect the other end of the cable to the SCSI adapter card, making sure you line up PIN 1 on the cable with PIN 1 on the card.

If you're installing a SCSI CD-ROM drive, you'll need to connect the audio cable from your sound card to the rear of the CD-ROM drive. Make sure the left, right, and ground wires match the pins on the drive.

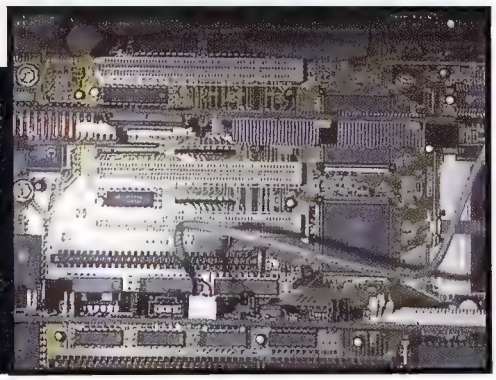
If you're using an external CD-ROM drive, you'll also need to connect an audio patch cable from the CD-ROM drive's line-out to the line-in on the sound card. This will enable you to hear audio CD's or Red Book audio through your computer's speakers.

6 Ahh'll Be Back

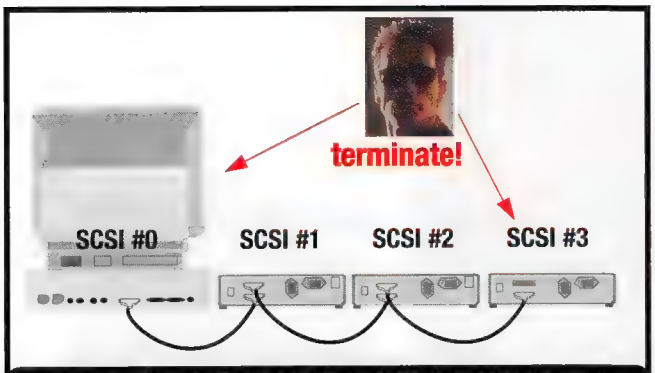
For SCSI devices to work properly, you must terminate the first and the last SCSI peripherals in the SCSI chain. Most SCSI adapter cards and SCSI drives are shipped with the termination set to the on position. If you're installing only one adapter card and one device, you don't have to worry about setting the terminators. When you begin to take advantage of the power of chaining peripherals and hook up more than two peripherals, you'll need to defeat the termination for devices positioned in the middle of the chain. If a device has not been terminated correctly, all of the devices in the chain will perform unreliably—or not at all. Correct examples:
Adapter Card (Device 0 Terminated by Default) → SCSI Drive (Device 1 Terminated by Default)
Adapter Card (Device 0 Terminated) → SCSI Hard Drive (Device 1 Not Terminated) → SCSI CD-ROM Drive (Device 2 Terminated)
Incorrect examples:
Adapter Card (Device 0 Terminated) → SCSI Hard Drive (Device 1 Terminated) → SCSI CD-ROM Drive (Device 2 Terminated)
Termination is usually accomplished by setting a jumper or switch on the SCSI device, or by installing terminator blocks. In some cases, termination can be set via software. Check the manual that came with the gear for your specific device.



When attaching the cable to the rear of the drive, make sure you line up the red stripe to the special marking or Pin 1. ⑤



③ To install a SCSI card, you'll need a free PCI slot. Look on the motherboard—they're the white ones. Most computers will only have three PCI slots and one slot may already be occupied by a video card.



⑥ Always terminate the first and last device in the chain. Otherwise, you'll get unreliable performance from the SCSI devices.

7 May I See Your ID?

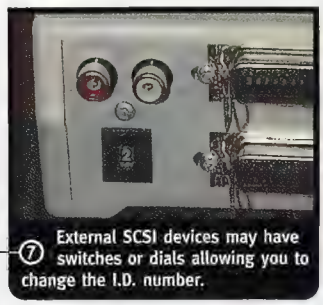
Each SCSI device in the chain must have a unique ID number. If you're installing products conforming to Win 95's Plug-and-Play spec, the ID numbers are automatically assigned. If not, the ID number can be changed by jumpers found at the back of the SCSI device. Simply remove or replace the jumpers to assign the numbers you want. External devices might have dip switches, push buttons, or even a thumbwheel. Make sure no two devices are assigned the same ID.

⑦ Each device must have a unique I.D. number. The I.D. may be set by jumpers on the rear of the drive.

8 Power-Ups

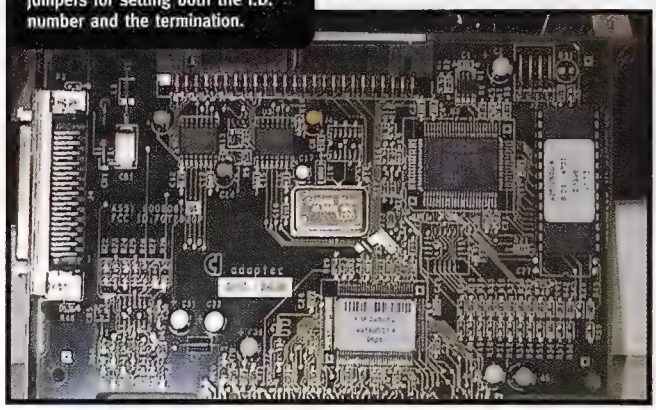
Now that each device has been properly terminated and the ID numbers have been assigned, you need to give your SCSI devices juice from your computer's power supply. Find your system's power supply, locate an unused power cable, and plug it into the back of the SCSI device. The power cable can fit only one way. If the cable does not fit, flip it over and try again. Do not force any cable that doesn't fit; you can damage both the device and the cable.

If you're installing an external device, just plug it into a power strip. You'll also need to connect the external cable from the back of the SCSI adapter card to the back of the SCSI device. Secure the cable by moving the wire brackets inward.



⑦ External SCSI devices may have switches or dials allowing you to change the I.D. number.

⑦ The adapter card has internal jumpers for setting both the I.D. number and the termination.

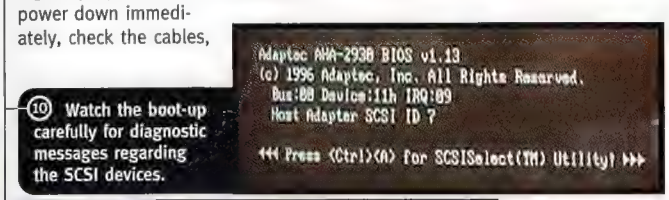


9 Lighting Techniques

The adapter card will have an LED that allows you to monitor activity on the SCSI bus. If you're replacing your IDE hard drive with a SCSI model, disconnect the LED connector from the motherboard and connect it to the LED connector on the adapter card. If you plan to keep your IDE drive, consider rigging an additional LED and mounting it on the front bezel. You will then be able to monitor all activity from the front of your computer. This does not affect the performance of your SCSI devices and is a completely optional step.

10 boot—Pure PC Power

Now that the adapter card and devices have been installed, reinstall your PC's power cable. Turn on the PC and make sure the computer boots up. If any of the cables have been installed incorrectly, the machine may lock up or make alarming beeping noises. If this happens, power down immediately, check the cables, and try again. Confirm that the new device(s) are recognized by your operating system. Monitor the boot-up procedure for diagnostic messages regarding the SCSI devices. Many adapter cards have a keyboard hot key to modify the SCSI bus and device parameters.


Adaptec AHA-2930 BIOS v1.13
(c) 1996 Adaptec, Inc. All Rights Reserved.
Bus:00 Device:11h IRQ:09
Host Adapter SCSI ID ?
<<< Press <Ctrl><A> for SCSISelect(TM) Utility! >>>

⑩ Watch the boot-up carefully for diagnostic messages regarding the SCSI devices.

⑩ Many SCSI devices can be modified or configured through software. You may have to install SCSI utilities to ensure proper performance.

11 Drivers' Test

If you're running Win 95, the Plug-and-Play BIOS should automatically recognize your new devices upon start-up. You shouldn't have to install any special device drivers. If you're running other platforms, (including Windows NT, Unix, or OS/2), you'll have to install device drivers. Check the documentation that came with your SCSI device to install the device drivers correctly.

12 That's It!

You can now replace the computer cover that you removed in step one, using the screws to secure it in place.

Trouble-shooting Your New SCSI

If you run into any problems while installing the SCSI adapter card or SCSI devices, check these first:

- The PC is PCI revision 2.0 compliant (check with your BIOS manufacturer).
- All SCSI devices are powered up.
- All cables have been installed correctly (check PIN 1 alignments and cable striping).
- All SCSI devices have unique ID numbers (no duplicates).
- The SCSI chain is correctly terminated.
- The system CMOS does not require PCI bus parameters be enabled.
- If you have both a SCSI and a non-SCSI hard drive, your system will always boot using the non-SCSI hard drive.
- If you still run into problems, check the IRQ assignments, adapter board, and BIOS settings. If things are still not working, try another slot.

boot worthy

EACH MONTH, **BOOT** EDITORS COMPILE THE BEST **PRODUCTS** IN A SPECIFIC CATEGORY AND DEEM THEM: BOOT**WORTHY**

this month:

CD-ROM Changers

650MB is not enough. But just like the 10MB hard drive on the original XT, one CD-ROM is no longer sufficient to contain the assets of some of the latest games and reference works. *Wing Commander IV* shipped on four discs; *Phantasmagoria* shipped on seven. The latest version of *SelectPhone* requires six discs.

Like most people, you probably find yourself multitasking as much as your computer: you're playing a game, then you're browsing an encyclopedia, then you're looking up a pithy quote on your *Bartlett's* disc. Using a conventional CD-ROM drive, you'll find yourself constantly swapping discs in and out of the drive, looking for jewel cases under stacks of paper, wasting precious time.

A CD-ROM changer does away with all that. Plug one of these puppies into your system and you have as many as six discs—nearly 4GB of data—at your fingertips. Who makes the bootWorthy models of these miracle machines? Nakamichi, NEC, and Pioneer.

— Michael Brown

Nakamichi MJ-4.8s

PRICE: $549
CONFIGURATION: 8x four-disc CD-ROM
COMPANY: Nakamichi
PHONE: 310.538.8150
URL: www.nakamichiusa.com

Best known for its high-end home and pro audio components, Nakamichi has been quietly designing and building CD-ROM drives for some time, and recently jumped into the multimedia market with its own name-brand components. The MJ-4.8s, their latest product is the only 8x CD-ROM changer on the market.

Selling the fastest changer you can buy, Nakamichi prices it accordingly: suggested list price is $549. Besides its speed—sustained data transfer rate spec'd at 1.2MB/sec and a claimed average access time of 150ms—the MJ's design eliminates the need for caddies, magazines, and trays. Like the CD player in a typical multi-disc car stereo, you load the drive by simply inserting the discs into a slot on the faceplate. The drive's loading mechanism grabs only a 2mm area at the outside of the rim of the disc, so there's minimal physical contact with the media as the disc is drawn in.

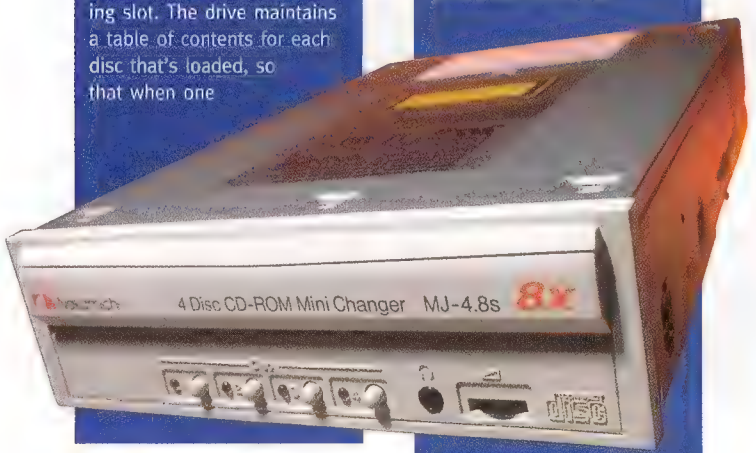
Access to the four discs in the drive (2.7GB of data) is controlled by four buttons across the front of the unit. An indicator light next to each button glows when a disc occupies a corresponding slot. The drive maintains a table of contents for each disc that's loaded, so that when one disc is removed, the drive doesn't need to re-scan all the discs. Other front-panel controls include a headphone jack and volume control.

Nakamichi MJ-4.8s

Since the half-height drive doesn't use a loading tray, the unit can be mounted either horizontally or vertically. And because the drive uses the SCSI-2 device-interface standard, multiple drives can be mounted in racks for network server applications, with each drive consuming only one SCSI ID location.

The MJ features special seals on the front-panel slot and the load and eject buttons that prevent the drive's fan from sucking dust into the mechanism. A 256K buffer speeds data access by keeping frequently accessed data in memory. And for all you enhanced CD fans, the MJ-4.8s is compatible with the CD-Plus format.

The MJ-4.8s is a pricey solution, but it's the fastest changer you can buy.



NEC MultiSpin 4x4

PRICE: $99
CONFIGURATION: 4x four-disc changer; IDE/ATAPI interface
COMPANY: NEC Technologies
PHONE: 800.632.4636
URL: www.nec.com

NEC is one of the biggest names in CD-ROM drive tech, but their CD-ROM changers are manufactured by [illegible] Nakamichi.

The NEC MultiSpin 4x4 (what a great name) uses Nakamichi's sound-speed mechanism. Although the 4x4 delivers only half the speed of the Nak, NEC prices the drive at just $99. You could buy five of these drives for less than the price of one by a lot. The 4x4 is saddled with a two-tiered data-transfer rate of 600K/sec and an average access time of 250ms. This level of performance is adequate for less demanding applications, such as browsing databases or retrieving works in progress, but you might experience occasional hiccups playing long FMV streams.

The 4x4's construction is very similar to that of the Nakamichi, including the seals that prevent dust from entering and contaminating the discs. The one the 4x4 has [illegible]

NGC MultiSpin 4x4

[illegible] A headphone jack and volume control are on the front panel, as are the keys for opening the door of NEC's caddy drives. The 4x4 is compliant with the CD-Plus standard. Since the [illegible] drive doesn't use a loading tray, you can mount it either horizontally or vertically. The 4x4's [illegible] specs were higher when you ran [illegible] NEC includes an EIDE/ATAPI interface card and a [illegible] in the kit.

If you don't need the speed of an 8x drive, the NEC is a great buy.

Pioneer DRM-624X

PRICE: $329
CONFIGURATION: 4.4x six-disc changer; SCSI interface
COMPANY: Pioneer New Media Technologies
PHONE: 800.444.6784

Pioneer's changer differs from the Nakamichi and NEC drives in several considerable ways. First, the DRM-624X is an external drive. This is handy if you have several computers and want to swap a single drive between them.

Second, the 624X features a disc magazine that can hold six discs at a time for a total storage capacity of 3.9GB. The magazines (which sell for $25 each) are especially convenient for institutional applications—such as schools and libraries—because the discs can be locked in the magazine inside the drive. The magazines are interchangeable with those that Pioneer uses in its audio-CD changers (both for the home and the car); a convenience if you use your drive primarily for playing audio CDs and own a Pioneer audio-CD changer. The discs are mounted upside down in the magazine, so dust doesn't accumulate on the drive's read head.

Speed-wise, the Pioneer ranks in between the Nakamichi and the NEC, with a sustained data-transfer rate of 676K/sec and an average access time of 150ms. The drive has a 128K buffer.

Disc changing is handled in software; the only buttons on the drive's front panel are for power and eject. The drive does have a headphone jack and volume control; there's also a set of audio-

Pioneer DRM-624X

output jacks (RCA style) on the back panel. The 624X is CD-Plus compatible.

If having six discs at your disposal doesn't quench your thirst for multimedia, Pioneer also offers the DRAM-1004X. With this jukebox unit attached to your SCSI controller, you can have as many as 100 discs—in two 50-disc magazines—available at all times. The DRAM-1004X sells for a mere $13,995 and includes four readers. Tack on another $2,000 and you can squeeze a CD-ROM recorder in the same chassis.

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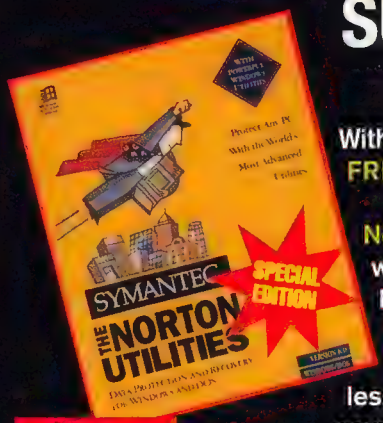

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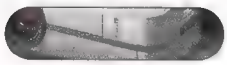
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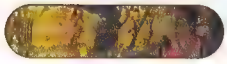
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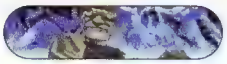
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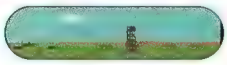
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Future 3D

What's next?

In less than a year, 3D graphics accelerators have gone from being esoteric add-ons, to preinstalled features on high-end PCs; and the pace of new product announcements shows no sign of slowing. Each time we're amazed by the acceleration that one of these chips delivers with games such as *Descent* or *MechWarrior*, we hear about a new chip on the horizon that promises to blow everything else out of the water.

Now that Microsoft's Direct3D API is finally out (it was part of the DirectX-2 Software Developers' Kit), the number of games and other types of software that will benefit from—and be designed for—3D graphics acceleration is set to explode. When that happens, 3D graphics accelerators will become *de rigueur* for gamers, VRML surfers, and anyone who uses 3D design and animation packages.

With so much change happening so rapidly, it becomes almost as important to know what's around the corner as it does to know what's available now. Join us as we peer into the *boot* crystal ball to conjure the future.

Rendition Vérité

There was a time when many people pointed to Rendition's Vérité chip as the indicator of what could be accomplished in the area of 3D graphics acceleration. In fact, Microsoft picked the Vérité as the hardware reference platform for Direct3D. Trade show demos have offered enticing glimpses of what this chip can do, and nearly every major game developer (including Interplay, id, and Psygnosis) has announced plans to market games labeled "Rendition Ready."

The Vérité does promise an impressive set of features, including an embedded graphics RISC processor that takes some load off the CPU and bus. The chip is capable of perspective-correct texture mapping; bilinear filtering of texture maps; edge-antialiasing; support for true color; Z-buffering; fog/haze; and scaleable, antialiased sprites. The chip also performs 2D graphics acceleration.

Rendition is very late at getting this chip to market, however. To date, Creative Labs is the only company to announce a Vérité-based product—the second generation 3D Blaster—but the card was not shipping at press time. Rendition assures us that they'll be announcing more customers soon, but Diamond Multimedia and Orchid Technology have jumped on both the S3 ViRGE and 3Dfx Voodoo bandwagons; IBM and Sony are in ATI's camp using the 3D Rage; VideoLogic is using the NEC PowerVR (which it helped to develop); Compaq is using both the PowerVR and the ViRGE; and NEC is using both the Voodoo and the 3D Rage. Lastly, Number Nine Visual Technologies recently backed away from plans to build a Vérité-based card because Rendition couldn't supply the part.

On the other hand, id Software's John Carmack has been quoted as saying that the Vérité "will be the premier platform for *Quake*." Until a card using the chip reaches the market, it's impossible to tell whether such comments are you-scratch-my-back-and-I'll-scratch-yours marketing hype or if the Vérité really is that good.

Note the clarity of the texture maps in this shot of *Quake* running Rendition's Vérité 3D graphics accelerator.

Chromatic Research Mpact

Looking even further down the road, we see Chromatic Research's Mpact coming at us at full steam—or is that just a mirage on the horizon? A Chromatic press release dated October 9, 1995 says "Users should

TriTech claims its Pyramid chip can animate this scene in real time. Wow!

expect to see PCs with the Mpact solution inside during the first half of 1996." Hmm. It's October. Looks like they're gonna be late.

Not content with accelerating 3D graphics, Chromatic's Mpact chip aims to take over just about every media function you can think of: MPEG-1 and MPEG-2 decoding; real time MPEG-1 encoding; 2D and 3D graphics acceleration; FM and wavetable synthesis, with support for both 3D audio and Dolby AC-3 surround sound; fax/modem functionality; full-duplex speakerphone; and video teleconferencing, supporting both the H.320 standard for ISDN and the H.324 standard for POTS lines.

One of the interesting characteristics of the Mpact media engine is that it consists of both a hardware component (the chip) and a set of software components (Chromatic calls them MediaWare modules). Update one or more of the MediaWare modules and you can upgrade the functionality of the processor, according to Chromatic.

When it ships, Chromatic Research's Mpact could raise the bar on minimum standard features for new PCs.

Putting all these features on one chip will allow manufacturers to vastly increase the functionality of even the most basic PC, and Chromatic claims the part will add no more than $150 to the manufacturing cost of PC motherboards.

If Chromatic is successful, you won't be able to buy a high-end PC that doesn't offer these features—whether it uses Chromatic's part or someone else's. The Mpact could raise the bar for everybody.

Real 3D

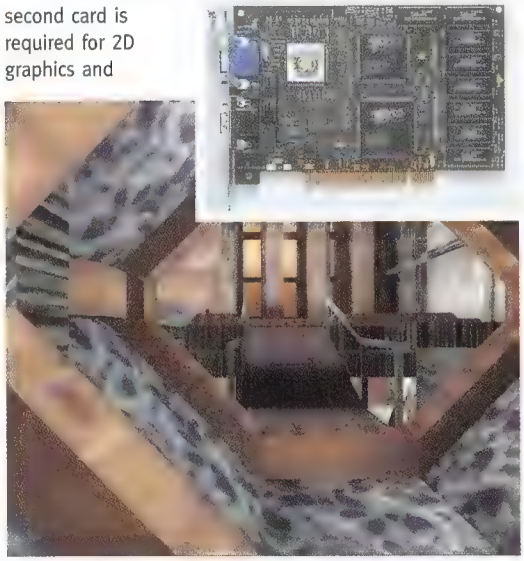
Real 3D, a subsidiary of the giant defense contractor Lockheed Martin, has been producing flight- and combat-simulators for the Pentagon since the 1960s. In the 1980s, the company developed arcade-game technology for Sega Enterprises, culminating in the Model 3 Computer Graphics System that Sega uses in its amazing new *Virtua Fighter III* arcade game. Now, Real 3D is partnering with Intel to produce a single-chip 3D graphics accelerator that will take advantage of Intel's new Accelerated Graphics Port architecture.

The new chip isn't expected to reach the market until mid-1997, and Real 3D has been reluctant to release many details of the chip's proposed capabilities. We do know that the chip is intended to be an all-in-one 2D and 3D accelerator, and that it will support Direct3D. From what is known about AGP, we can also guess that the chip will store much of the graphics information that it is manipulating in main system memory, instead of requiring an expensive frame buffer. For additional information, see the sidebar "3D and Intel's AGP."

3Dfx Interactive Voodoo Graphics

Products using 3Dfx's Voodoo Graphics chipset have already been announced. Some of them, including NEC Technologies' PowerPlayer 2010 desktop computer (previewed in *boot* 01), should be on store shelves now. In addition, Diamond Multimedia will use the chipset in its recently announced Monster 3D accelerator, which is scheduled to ship mid to late October. The card, populated with 4MB of EDO DRAM, will fetch an estimated street price ranging from $249 to $279 and will include several games optimized for the Voodoo. Orchid Technology's Voodoo Graphics-based Righteous 3D card will possesses similar features and will sell for around $299.

The Voodoo features perspective correction, Z-buffering, mip-mapping, antialiasing, and bilinear and advanced composite texturing in real time. One of the most interesting characteristics of the Voodoo is that it accelerates *only* 3D graphics, which means that a second card is required for 2D graphics and video acceleration. (The video output from the 2D card is piped into the Voodoo Graphics-based card, blended with the Voodoo's signal, and output to the monitor.) For system manufacturers, this solution will be more expensive than most because they'll need to also buy a 2D graphics accelerator. In terms of performance, however, it promises the best of both worlds because you don't have to give up your favorite graphics card to gain 3D acceleration.



Diamond Multimedia and Orchid Technology have both announced graphics accelerators based on the 3Dfx Interactive Voodoo Graphics chipset. This scene from *Prey* was rendered on the Voodoo.

NEC Electronics' PowerVR

Developed in conjunction with VideoLogic, NEC's PowerVR PCX1 chip is similar to the Voodoo Graphics chipset in that it doesn't handle 2D acceleration; instead, it accesses the system's VGA chip. In this case, however, it talks to the chip through the PCI bus instead of a video pass-through cable.

One of PowerVR's unique characteristics is that it doesn't use Z-buffer memory; instead, it handles hidden-surface removal with the Image Synthesis Processor that is integrated into the chip. NEC claims that this technique eliminates both the cost and the performance bottleneck associated with Z-buffer memory. NEC also claims that by texturing and shading only the pixels that are visible, the PowerVR can render even highly complex scenes faster than other chips.

Compaq is using the PowerVR chip in its Presario 8710 (see the review on page 76), and VideoLogic is expected to announce an add-on card soon. ▶98

Dracula: Truth and Terror

A biting commentary about the undead

Long before Tom Cruise fell in love with Brad Pitt in the film adaptation of Anne Rice's Interview with the Vampire, *even before Bela Lugosi terrified audiences with his grim portrayal of Bram Stoker's* Dracula, *undead bloodsuckers have haunted our collective imagination. Now Voyager, a publisher known for masterfully tackling offbeat subject matter, will soon release its take on the phenomenon, with* Dracula: Truth and Terror.

Just before sunrise, we spoke with producer Whit Fisher, to find out if Voyager will have something for us to sink our teeth into.

boot: Was there any original research done for this title, or is it just a collection of information based on myths and movies?

Fisher: We are doing this CD-ROM with Raymond T. McNally, who is a professor of Russian and European history at Boston College. He is the guy, who back in 1969, let the world know that there was a historical character called Dracula who Bram Stoker's Dracula was based on, the guy people have now heard of as Vlad the Impaler. Born in Transylvania, he ruled in Wallachia, a neighboring province. Vlad was also called Dracula, which means "son of the devil" in Romanian. He was a big crusader against the Turkish army. So even though he was this sicko murderer, who also killed thousands of his own people, he was praised by the Pope for upholding the Christian faith.

The disc is, in part, based on Vlad and also on the phenomenon of Dracula, the fictional character. The part of the CD based on Vlad will include photos McNally has collected in Transylvania and various archives from all over the world. It will also have a comprehensive index of all the vampire films ever made—1,066 in total. That will be a viable tool for people who want to find out about freaky vampire movies. *Dracula Meets the Hippie Space Chick* is one example.

Voyager's *Dracula* promises to be rich in content and design.

In another part of the CD, we have the entire text of Bram Stoker's *Dracula*, including "Dracula's Guest," the first chapter that wasn't originally published with the book. That will have annotations by McNally, who has access to the original notes for the book. Some annotations describe actual characters who appear in the book, like Mark Twain is quoted in *Dracula*. Oscar Wilde is one of the characters Count Dracula might be based on. And in another section we have the movie *Nosferatu*, the first Dracula movie ever made, in its one-hour entirety. It's the only vampire movie recommended by the Vatican because it is said to contain special religious significance.

> "... there have been a couple of cases of serial killers who thought they were vampires."

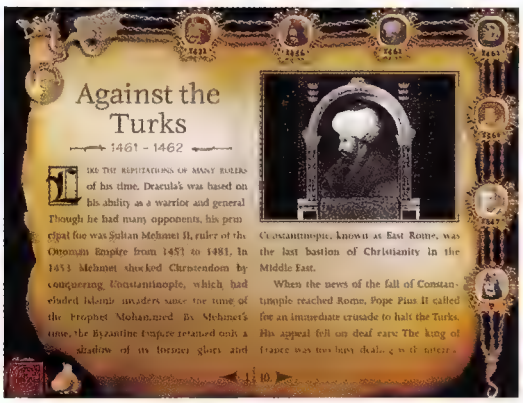
boot: It's amazing how many people are into vampires.

Fisher: It turns out that many cultures have vampire myths, like China, Malaysia, and Japan. And there have been a couple of cases of serial killers who thought they were vampires. I even met up with a man who makes realistic fangs and contact lenses for people who want to look like vampires. You cannot believe the amount of vampire buffs out there. It blew me away. I had heard about these people, and I was kinda nervous about meeting them. But if you showed even the slightest bit of interest in this subject matter, they were your friend immediately.

— Doug Lombardi

The disc contains an archive of 1,066 Dracula films.

The content is a mix of factual information about Vlad the Impaler and the fictional Dracula.



The disc includes archival material about Dracula, a murderer, who was also praised by the Pope for upholding the Christian faith.

Voyager drew on Professor Raymond T. McNally's research about Transylvania and Dracula for the title.

AVAILABLE: OCT. '96
PRICE: $39.95
COMPANY: VOYAGER
PHONE: 800.446.2001
URL: WWW.VOYAGERCO.COM

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Product Information Number 272

Compaq Presario 3020

You can never be too thin

Compaq is breaking computer design conventions with the first series of desktop multimedia computers to be equipped with a flat-panel display instead of a CRT monitor. Unplug the power cord and you'll be able to tote a Presario 3020 from room to room.

Still, these machines are not true portables. Compaq estimates they'll weigh in at just under 30 pounds, and they won't run on batteries. But if you decide to analyze your budget on the kitchen table while gobbling a midnight snack, you can easily move the computer from the den. "We wanted to create something that wasn't an eyesore in the living room and could, occasionally, be moved to another room," says Compaq product manager Kevin Frost.

Since battery life isn't an issue, the Presario 3020's 12.1-inch DoubleBright TFT display will pump two light sources through a wide-angle LCD. Compaq promises an especially bright display that doesn't distort even when viewed from the sides. This is important, because the display will tilt, but it won't swivel.

The 3020 will feature a 166MHz Pentium under the hood, with 24MB of EDO DRAM, a 2GB hard drive, and a 33.6Kbps fax/modem. Each model in the 3000 series will also feature an NEC 6x, four-disc CD-ROM changer that's built into the side of the chassis. The drive uses a single volume letter for all four discs, so you won't need to memorize the path Win 95 arbitrarily assigns each one.

A pair of JBL speakers will be built into the case, mounted behind and adjacent to the display. Although the case is shallow, the 3000 series will offer two PCI and two ISA expansion slots, plus a full contingent of I/O ports, including two USB ports. There will be no open drive bays, however.

Compaq plans to offer a digital camera that will feed video to the system through one of its USB ports. The camera, which is expected to cost less than $200, will be able to pump full-motion color video through the system at 15fps. Using Intel's Video Phone technology, the Presario will enable you to make videophone calls using a single analog phone line—provided the other party is also equipped with a video teleconferencing system that complies with the H.324 standard.

The Presario 3020 has a flat panel display that is especially bright and readable..

The Presario 3020 will have a three-button cordless mouse (using radio frequencies in the 100kHz to 150kHz spectrum to eliminate line-of-sight requirements), but the keyboard will be hardwired to the system.

Compaq will market these machines to the "image and design conscious" who are "somewhat more affluent," according to Frost.

— Doug Lombardi

AVAILABLE: OCT 96
PRICE: $3,499
COMPANY: COMPAQ COMPUTER
PHONE: 800.345.1518
URL: www.compaq.com

Nimantics Orion 6X 166 laptop

Packin' plenty, but not the heat

The Orion series of laptops from Nimantics is now the fastest in town. Featuring the *desktop* version of Intel's 166MHz Pentium, 32MB of RAM, a 2.1GB hard-disk drive, and a 6x CD-ROM drive—all accessible without having to swap components—this $4,848 laptop packs enough power to hang with most desktop systems.

We were curious to discover how Nimantics could pack a 166MHz Pentium into a portable chassis without turning the laptop into the combustible equivalent of a 1978 Ford Pinto. The answer lies in Nimantics' patented heat-sink-and-fan cooling system. According to Nick Ray, Nimantics' VP of sales, this design dissipates heat so well that the desktop Pentium never gets any warmer than Intel's mobile version.

"We've taken care of the heat," says Ray. "When [the mobile Pentiums] become available, we'll use them because they have a slight battery advantage." Supplying power to a fast processor, and all those peripherals—all at the same time—sucks juice out of a battery faster than a dehydrated elephant at a watering hole, so Nimantics supplies an optional second battery that attaches to the back of the Orion. And if you can't get enough gaming in at the office, the Orion features both an Advanced Gravis GamePad (built right into the top deck) and a joystick/MIDI port (on the left side).

The Orion 6X 166 is the fastest laptop you can buy.

If you crave speed and power, the Orion looks like it has it. Look for a hands-on review in the November issue of *boot*.

— Doug Lombardi

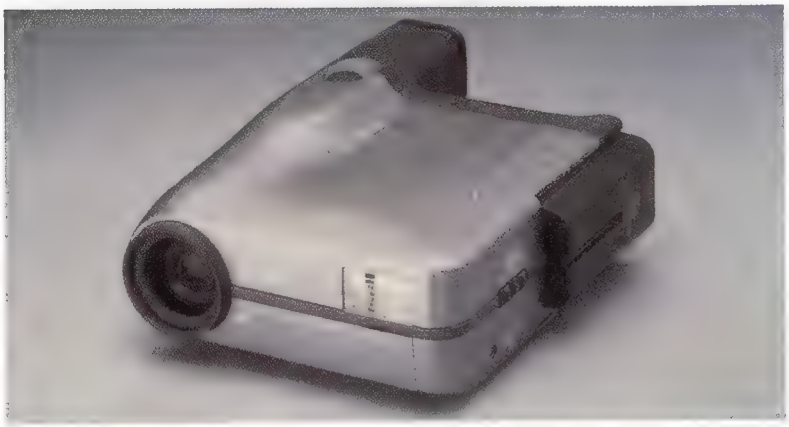
AVAILABLE: NOW
PRICE: $4,848
COMPANY: NIMANTICS
PHONE: 800.646.5005
URL: www.nimantics.com

Sony DKC-ID1

Feature set includes color viewfinder

Having established a prominent position in the digital video and digital audio markets, Sony is jumping into the digital still camera market with the DKC-ID1. Targeted at the industrial market (it should be a great tool for Web masters), this $1,795 camera features a color, through-the-lens viewfinder.

Equipped with a 450,000-pixel, progressive-scan CCD, the DKC-ID1 captures images with up to 768x576 dots of resolution and up to 24-bits of color depth. Images are stored on PCMCIA Type II memory cards using JPEG compression. The 2MB memory card bundled with the camera holds eight images in fine mode and 28 images in normal mode; a 10MB card will store 40 images in fine mode and 140 images in normal mode. A built-in SCSI-2 interface makes short work of downloading images either to your PC or to an optional MiniDisc unit.



Sony's new DKC-ID1 digital camera features a color LCD in the viewfinder.

The camera features a 12x zoom lens with macro (equivalent to a 38mm to 460mm zoom lens on a conventional 35mm camera) and can be focused either manually or automatically. Shutter speeds range from 1/15 of a second (good for low-light conditions) to 1/4,000 of a second (great for capturing brightly lit action shots). The camera runs in full auto mode by default, but you can set it to aperture-priority mode or shutter-priority mode if you want to get creative. You can use the color LCD in the viewfinder both to frame your shots and to review pictures you've already taken.

A monochrome LCD panel on the back of the camera displays status information. The unit runs on a rechargeable lithium-ion battery, but it can also be powered by an AC adapter. The DKC-ID1 isn't the smallest camera on the market, but weighing just 26 ounces, it's not the heaviest, either.

— *Doug Lombardi*

AVAILABLE: NOW
PRICE: $1,795
COMPANY: SONY ELECTRONICS
PHONE: 800.472.7669
URL: www.sony.com

Olympus SYS.230

New MO drive to feature low-cost media

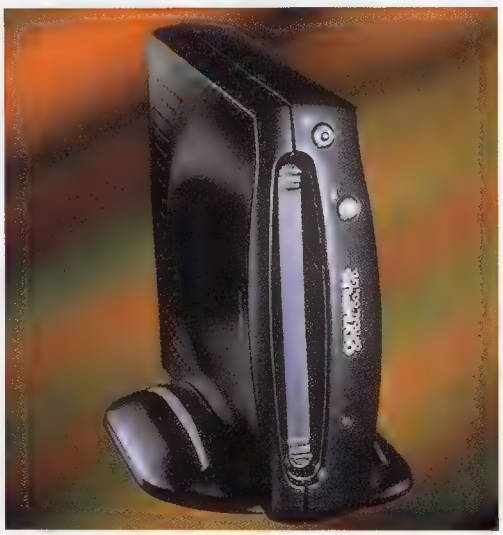
While Iomega and SyQuest have been battling with their proprietary removable storage systems, companies such as Olympus have been quietly selling ISO-standard magneto-optical drives. MO drives aren't as popular, and one reason may be related to the cost of the media, but Olympus promises to change that with its new SYS.230 drive.

Each Olympus-branded 230MB cartridge will sell for just $10, offering the capacity of a SyQuest EZ230 cartridge for one-third the price. Compared to an Iomega Zip cartridge, Olympus' MO disks will offer 130 percent more capacity for nearly half the price. The drive itself is expected to have a street price of $299 for the internal model (you'll need a SCSI adapter and ribbon connector). The drive will also be available in two external configurations: A $359 SCSI-only model (including a SCSI cable), and a $389 Universal model featuring both SCSI and parallel connectors (including a SCSI cable and a parallel cable with a printer pass-through).

Under SCSI control, Olympus promises a maximum data transfer rate of 2.4MB/sec; connected to a parallel port, the drive should deliver a transfer rate of about 1.25MB/sec. Olympus claims an average seek time of less than 17ms. If you're looking for a portable unit, the external drive will fit the bill, measuring 8x6x2 inches and weighing in at about two pounds.

The SYS.230 will read and write older 135MB cartridges, according to Olympus, but the media is also designed to be compatible with the next step in 3.5-inch MO standards: drives with 640MB and 1GB capacities. The SYS.230 should be available now.

— *Michael Brown*



The Olympus SYS.230 operates either horizontally or vertically. The external models come with a cradle that holds the drive and two disks.

AVAILABLE: NOW
PRICE: $299 (INTERNAL SCSI), $359 (EXTERNAL SCSI), $389 (EXTERNAL SCSI/ PARALLEL)
COMPANY: OLYMPUS IMAGE SYSTEMS
PHONE: 800.347.4027
URL: www.olympusamerica.com

Return to Krondor

If looks could kill

Realistic animated 3D characters set in a crisp 2D environment and story elements taken from the Ray Feist book series, promise to make Return to Krondor *much more than a sequel. This combat RPG is reaching completion at 7th Level's Glendale, Calif. facility. We spoke with coproducer Andy Ashcraft to find out what we can expect from the sequel to* Betrayal at Krondor, *the classic text adventure that Sierra On-Line published more than two years ago.*

boot: This game has been in production for a long time, which is out of character for 7th Level. What's going on?

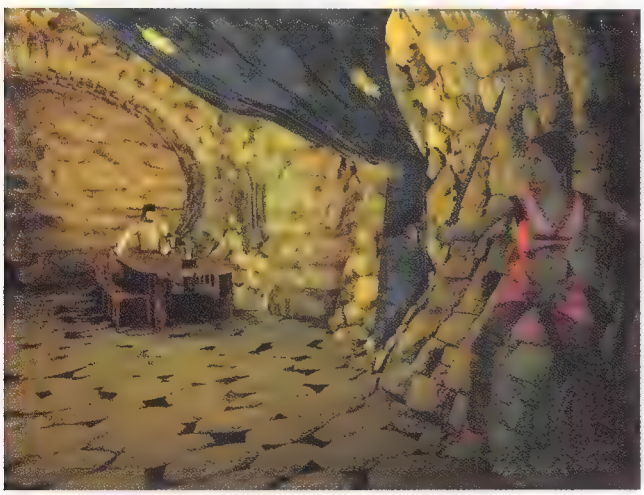
Ashcraft: It started in March of last year, and it's gone through a number of iterations. It was much like the original when it started. But the quality was an issue. This game, as it is now, was started last November. We never chucked everything all at once, but between November and February we chucked everything we had done previous to then. And I'm happy to say that we haven't made any bad decisions. Every change that we have made has been two steps better.

Much of the production time for this sequel has been spent on the development of its turn-based combat system.

boot: How would you describe the game now?

Ashcraft: We have a very tactical, turn-based combat system worked out now, which is very cool because a lot of the gameplay is about combat. We've been trying to create a system that allows us to build each combat sequence as some sort of tactical puzzle as opposed to 'now you have to beat this thing down to the ground, and then you have to beat this next thing down to the ground.' We're trying to make it a little more complicated than that.

About a year ago there was a big push to make it real time, for the *WarCraft* fans. But there is just no way that you can control more than one guy—more than one guy that you care about, I should say. In *WarCraft*, if you lose an Orc, you just go and get another one. If you lose James in this game, you're kinda screwed. 'Oops! He's one of your four guys.' You don't want to do that.



You command a party of four on a mission to recover a telephone to god.

boot: As a sequel spun originally from a book, this game must have a lot of story elements in addition to all the combat.

Return to Krondor **maintains the story elements from Ray Feist's books but adds lush graphics and colorful voice acting that were absent in its predecessor,** ***Betrayal at Krondor.***

Ashcraft: Yeah. There were a few things—and I'm not going to give away too much—left hanging at the end of *Betrayal at Krondor* that we picked up on. The major thrust of the story has to do with a religious artifact that is the church's best kept secret. It allows the people to speak with their god—directly. So it's basically a telephone to god. The bad guys want this for the obvious reasons, and there's nobody else who can go get it except the party members. So you are sent off to get this device before the bad guys do.

We're hoping to get more emotional punch out of this than most of the role-playing games that have come out so far by actually bringing the characters to life. It's an experiment. We don't know if a lot of this stuff is going to work. A lot of gamers would be perfectly happy if we did only text. But we're going for a slightly bigger audience. In one case, we have the party going to a small town. We hired a dialect consultant and created a completely new accent for the townspeople. It's that kind of detail that we're going for. Most people won't notice, but the people who do pay attention are going to get a big kick out of it.

— Doug Lombardi

Although it will not support 3D graphics accelerators, the 2D environments and 3D characters promise an immersive gaming experience.

AVAILABLE: NOV. '96
PRICE: $49.99
COMPANY: 7TH LEVEL
PHONE: 800.884.8863
URL: WWW.7THLEVEL.COM

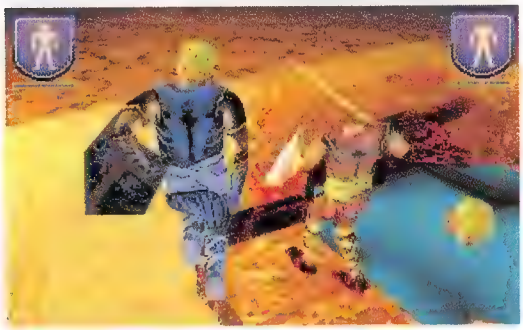
Die By the Sword

Pull your own punches

Die By the Sword is a promising beat-'em-up in a crowded field of 3D fighting games due out this winter. In addition to delivering the unparalleled satisfaction of beating your butt ugly virtual opponent to a bloody pulp (a *must* in any fighting game worth its metal), this contender allows you to get medieval with your own collection of custom moves, savoring the satisfying kill scenes, all within the cozy confines of a deep 3D environment.

The included move editor will be able to create custom fighting maneuvers via a proprietary technology dubbed VSIM Motion Control, which is capable of generating a full range of human movements. Before each match, design four custom moves to use along with the game's preset ploys. As you design, you'll be able to view your maneuvers from multiple perspectives.

***Die By the Sword* is a new and improved beat-'em-up that allows you to create your own fighting moves and explore a 3D environment.**



Man, that's gotta hurt.

Die By the Sword will offer more than 25 enemies; each one with its own strengths, weaknesses, and weapons (including broadswords, spears, and double-bladed axes).

The most engrossing element of this game is its intensive 3D environment, which will give the texture-mapped polygon characters complete freedom of movement, such as jumping across chasms or falling off cliffs in the middle of battle—a tremendous improvement over the constraints of the invisible ring.

No game released this side of 1995 would be worth the disc it's pressed on if it didn't support remote multiplayer action, and *Die By the Sword* will support head-to-head battle via the usual serial connection, modem, or network.

— Doug Lombardi

AVAILABLE: JAN. '97
PRICE: $49.95 (ESTIMATED)
COMPANY: INTERPLAY
PHONE: 800.969.4263
URL: WWW.INTERPLAY.COM

Pinball Builder

Nothing like it in any amusement hall

There's been a flood of pinball sims lately, but none have allowed you to create and play your own table. *Pinball Builder* will.

Start by selecting one of 16 table themes, such as Tank Command, Starship, or Pitstop. Each table includes preset ramps, side guards, and flippers. Then simply drag-and-drop elements, such as jet bumpers, targets, lights, and kickers, to give your table whatever action and feel strikes your fancy. You'll also be able to assign properties, such as bonus points or extra balls, to any object on the table.

The Graphics Import/Export screen lets you add your own imagery (PCX and BMP formats). For example, If you want to dedicate a table to your wife, your girlfriend, or Pamela Anderson, all you need do is digitize an image and drop it in. Developer 21st Century Entertainment plans on bundling the shareware version of *Paintshop Pro*, which lets you format and edit images you'd like to use, and they also plan to include a collection of decals.

The Editor mode allows you to adjust everything on the table, from graphics to speed to bonuses.

Everyone knows that all looks and no play make for a boring pinball game, so *Pinball Builder* will let you customize the action of any table you construct, including such options as multiball play, speed control, and table angles. A host of MIDI music files and digital sound effects will enable you to embellish your creation with aural delights.

Once you've created your own library of personalized tables, you'll be able to exchange them with friends (at least with those who also own the *Pinball Builder* software).

Games and tables can be saved and exchanged with other owners of *Pinball Builder*.

— Doug Lombardi

AVAILABLE: NOV. '96
PRICE: $59.95
COMPANY: 21ST CENTURY ENTERTAINMENT
PHONE: 716.872.1200
URL: WWW.21STCENT.COM

S/W

iM1A2 Abrams: America's Main Battle Tank

SEE IT ON THE DISC

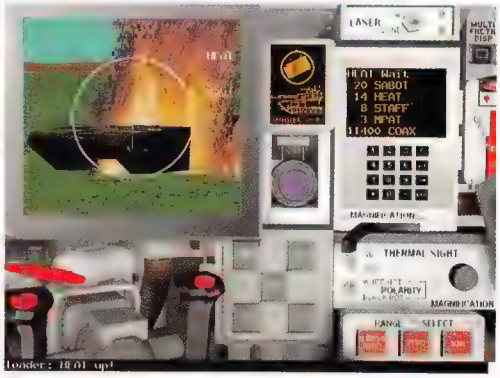
Rolling heavy metal

iM1A2 Abrams will put you in the driver's seat, the gunner's seat, the navigator's seat, and even in command of a squadron of the army's most powerful battle tanks. Interactive Magic's development team climbed behind the controls of an actual M1A2 before coding the sim, which looks to be heavy in terms of accurate simulation and strategy.

A lot of your time will be spent in the driver's seat of M1A2 Abrams positioning your tank and issuing orders to other tanks under your command.

iM1A2 Abrams will support graphics resolutions up to 640x480 in 256 colors. Most of what you see, in any resolution, is the interface. The flat graphics appear in a quarter-screen window. Play as a junior officer or tank platoon commander with settings for arcade, sim, quickstart (dogfight), or campaign.

Don't expect to jump in the tank and immediately do damage; you'll have to train with this mobile monster before you see meaningful action in the game's 75 battlefields. By battling the sim's A/I, you'll grow familiar with the tank's controls, map screens, and various artillery and soon be able to wage multiplayer war over a LAN or the Internet. *iM1A2* is expected to support Microsoft's DirectPlay and should be offered on several dedicated online gaming services.



The majority of the action takes place while you're in the gunner's seat.

The beta seen in these screen grabs (and playable in the demo on this month's *bootDisc*) does not include some features, such as enhanced graphics for explosions and smoke, and a more sophisticated A/I that Interactive Magic expects to include in the final version.

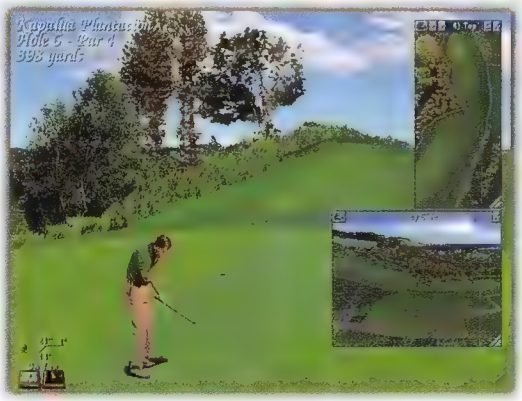
— Doug Lombardi

AVAILABLE: NOV. '96
PRICE: $50 (ESTIMATED)
COMPANY: INTERACTIVE MAGIC
PHONE: 800.789.1534
URL: WWW.IMAGICGAMES.COM

NEW LINKS LS: TOUR WITH THE LEGENDS IN SPORTS

What's New About Links LS? Every Leaf, Every Contour, Every Chirp...

...Up to 16.7 Million Colors– New Links LS has unlimited screen resolutions and up to 16.7 million colors—resolution independent means that Links LS can match any monitor's maximum viewing capabilities (even 1600x1200 and higher) and up to 16.7 million colors means the finest in color quality possible. You've simply never seen any golf simulation software this good!

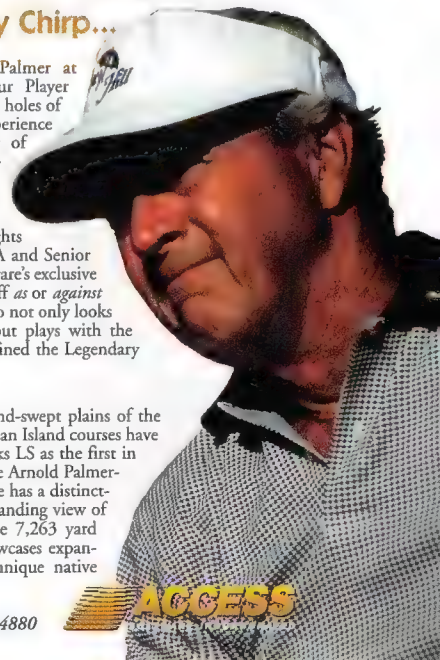


Features include new Post-Shot Reactions and Multiple Views!

...The Most Realistic Golf Simulation EVER– The totally new terrain rendering engine and ball flight give Links LS a realism never before achieved in the gaming industry. As Links has always done, we render not just the hole itself but the entire course and more—you literally can hit your ball a half-mile out of bounds! Now, authentic ground, sand, and grass textures combine with dynamic shadows and fog, to give you a course so lifelike you can almost feel the wet grass! Our engineers have reworked the ball dynamics giving you true-to-life ball flight. Fade your drive just like the pros or watch as your high arching wedge shot actually backs up on the green.

...Arnold Palmer– Arnold Palmer at Latrobe—the first in our Tour Player Series, delivers far more than 18 holes of golf. The Arnold Palmer experience includes a virtual reality tour of Arnie's workshop, office and trophy room. Roam freely in 360 degrees and examine the tools of the trade behind the legend. Listen to Mr. Palmer give insights and recollections about his PGA and Senior PGA tours through Access Software's exclusive multimedia footage. Then tee off *as* or *against* the digitized Arnold Palmer, who not only looks & sounds exactly like Arnie, but plays with the same style and tenacity that defined the Legendary Grand Master of Golf

...Kapalua– Resting on the wind-swept plains of the Golf Coast, two glorious Hawaiian Island courses have been selected to inaugurate Links LS as the first in the series of Resort Courses. The Arnold Palmer-designed Kapalua Village Course has a distinctly European flavor and a commanding view of the West Maui mountains. The 7,263 yard Kapalua Plantation Course showcases expansive slopes, deep valleys and unique native vegetation.



For more info, call 1-800-800-4880

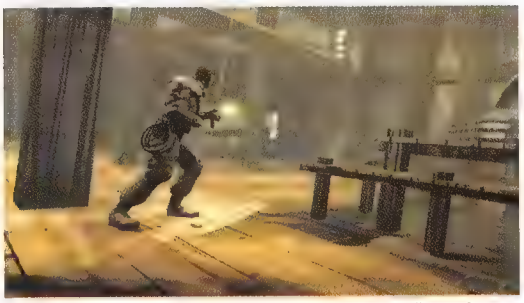
ACCESS

KGB Files

Remember when Commies were good guys?

KGB Files casts you as a Red Army commando in 1943 Europe, recruited by the Kremlin to dismantle the Third Reich's burgeoning atomic program. Your mission: Prevent Hitler from developing the first A-bomb.

Blue Sky Software is following a trend established by *Strife* by blending first-person shoot-'em-up action with elements of adventure gaming. "We are trying to make you feel like you are in the environment," says Blue Sky studio chief Dana Christianson. "We felt that there was something lacking in most games. I'm not going to say we've solved it, but we've done a lot of research on making people feel involved." Rather than dumping you in a maze and have you start blasting, your secret agent character will need to explore each new environment before wreaking havoc.



In *KGB Files*, you play the part of Lt. Ivan Tokarvec, elite Red Army commando. Your mission: Keep the A-bomb out of Hitler's hands.

Christianson describes the puzzle elements as "logical, unlike those found in *The 11th Hour* and similar games." And if puzzle solving isn't your bag, you can skip them altogether and jump right into the action.

KGB is being built with a proprietary 3D graphics engine and will feature unique cut scenes shot using motion-capture techniques and Blue Sky's own FEAR (Facial Emotion Animation Routine) technology. Animation rendered using FEAR looks similar to the live facial animation found in The Residents' *Bad Day On the Midway*, but *KGB*'s head shots can move from head-on to profile without morphing from live action to animation.

The game is played in letter-box format with shifting camera angles.

Ahh, the beloved jetpack. Take off with this baby on your back, and you'll find yourself dogfighting Nazi fighters.

When released next May, *KGB* will be a single-player game, but Blue Sky may also develop a multiplayer add-on pack. In the meantime, Christianson says the company will fine-tune the A/I and balance the action and puzzle sequences to make this title a top-caliber, cross-genre experience.

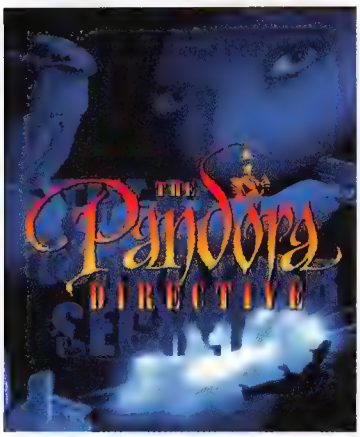
— Doug Lombardi

AVAILABLE: MAY '97
PRICE: TBA
COMPANY: BLUE SKY SOFTWARE
PHONE: 619.458.9880
URL: WWW.SKYGAMES.COM

2 LEVELS OF PLAY · 3 NARRATIVE PATHS · 7 DIFFERENT ENDINGS · The Pandora Directive · 23 UNIQUE CHARACTERS · 58 PLAYABLE ROOMS · 360 DEGREES OF FREEDOM

THE PANDORA DIRECTIVE: PLAY IT AGAIN, AND AGAIN...

Tex Murphy returns in the most replayable interactive movie ever made!



An Enormous Six-CD Cinematic Epic!

The Story– What is the truth behind the rumored UFO crash at Roswell, New Mexico? Why did the military suddenly shut down and seal off the Roswell complex? And why the frequent references to the lost Mayan civilization? It starts out like a hundred other cases. $500 a day (plus expenses) to track down a missing person. As you pick up Thomas Malloy's trail, you realize you're not the only one looking for him. By the time you discover that he's ex-military and knows what really happened on July 6, 1947, it's too late. The government's biggest secret is loose and you're trapped in a deadly game of cat and mouse with the most powerful and ruthless agency in the world. Based on the novel by Aaron Conners.

The Features– The most replayability of any interactive movie to date! Follow one of *three* narrative paths leading to *seven* different endings. Choose between *two* levels of play. The first level offers a complete on-line hint system to help you through the tougher puzzles. The second level—for expert gamers—has no hints available, but rewards players with higher bonus points, extra puzzles and locations. Our unique "Virtual World" engine allows you to slip under desks, rifle through drawers, and see the flies tanning in the light fixtures. Without the restrictions of rendered paths, you can explore Tex's three-dimensional world with full freedom of movement.

The Cast– Enjoy the difference Hollywood cinematography, acting, editing, stunt work, music, and direction make as the world of Tex Murphy becomes amazingly real. Starring Barry Corbin (*Northern Exposure, War Games*), Tanya Roberts (*View to a Kill, Beastmaster*), Kevin McCarthy (*Invasion of the Body Snatchers, Just Cause*), and Chris Jones (*Under a Killing Moon, Martian Memorandum, Mean Streets*) as Tex Murphy. Directed by Adrian Carr (*Quigly Down Under, Man from Snowy River, The Power Rangers*). Original music by Richie Havens and Nicole Tindall.

For more info, call 1-800-800-4880

ACCESS SOFTWARE INCORPORATED

Product Information Number 80

boot reviews

KICKIN' THE TIRES ON THE LATEST **HARDWARE** AND TAKIN' THE NEWEST **SOFTWARE** OUT FOR A SPIN

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ratings system

90 to 100% Dreamy The hardware you'll find in this category expands the realm of The Possible; the software breaks new ground and takes full advantage of the best hardware. If you care about computing, you must have this stuff.

80 to 89% Excellent The goods in this category don't push the envelope quite as hard, but they do offer excellent performance. Some of this stuff is esoteric enough that it holds only limited appeal.

Only the **best** earn enough respect to be worthy of our **editors' choice** award.

70 to 79% Solid These are more than "me too" products. They fine-tune the use of new technology, rather than push the envelope.

60 to 69% Good If it lands here, it's average. Look around and you'll find several nearly identical competitors. In most instances, however, there is some feature that makes it worth a second look.

50 to 59% Fair These products are behind the performance curve and fail to take advantage of readily available technology that could make them much better.

40 to 49% Lacking Anything in this category exhibits serious flaws, but it has a few redeeming qualities.

0 to 39 % Dregs Flat-out junk. The management of any company that produces more than one of these in a single year should be sacked.

H/W

Compaq Presario 8710

So near; yet, so far

Win 95 means the issue of Sound Blaster compatibility is dead and buried, right? Wrong. The issue has risen from the grave to rob the Compaq Presario 8710 of a *boot* Kick-Ass award. Compaq's new "Ultimate Multimedia Machine" had the award all sewn up, with impressive benchmark scores and great components, but then I loaded *Quake* and everything went to hell.

Games, particularly DOS-based games, are among the most demanding multimedia applications a PC will ever have to run. *WarCraft II*, *Terra Nova*, and *Duke Nukem 3D* ran on the 8710 without a hitch. So, when I ran the release version of *Quake* I couldn't believe my ears.

The 8710's sound card possesses 1MB of samples in ROM, plus 512K of on-board DRAM for recording custom samples, and a SIMM socket for another 5MB of sample RAM. Despite all this, *Quake*'s vicious Rottweilers sounded like Chihuahuas on helium, choruses of dying Grunts sounded like chipmunks on speed, and so it went. *Quake* is designed specifically for Sound Blaster-compatible cards. The STB sound card in the 8710 uses AMD's InterWave processor, which is partially incompatible with the Sound Blaster. *Quake* could get the chip to produce sound, but it wasn't the sound I wanted to hear.

The easy solution, of course, is to swap out the STB sound card with an AWE32 or something 100-percent compatible. But that tacks another $250 onto the price of the system. The other alternative would be to not play *Quake*, but other compatibility problems are sure to raise their ugly heads at some point.

Enough about the sound card, let's get back to the features that *do* make the 8710 bootWorthy. Start with the 200MHz Pentium, augmented by an Intel Triton VX core logic and 512K of pipeline burst cache. Toss in 32MB of EDO DRAM, 2.5GB of hard-disk storage, and an 8x CD-ROM drive. Top it off with *two* 3D graphics accelerators, with 6MB of video RAM between them. Got your taste buds goin' yet?

The JBP Pro Audio speakers included outperform the 8710's sound card.

Video

The 8710 has an S3 ViRGE 2D/3D graphics/video accelerator on its motherboard, with a 2MB EDO DRAM frame buffer. Considering that S3 has already sold more than one million ViRGE chips, that component seems destined for ubiquity. Seeking to set itself apart from the crowd, Compaq is augmenting the ViRGE with a dedicated 3D graphics accelerator based on NEC's PowerVR chip and 4MB of Synchronous DRAM.

The 8710 delivered excellent 2D performance in both Windows and DOS. Using the Ziff-Davis Graphics WinMark 96 test, the system pumped out 33.8 million pixels per second (at 800x600 resolution with 16-bit color depth). The results of our DOS-game tests—counting frames while running *Duke Nukem* and *Descent II*—were equally impressive. *Duke* delivered 76fps at 320x240, 22fps at 640x480, and 13fps at 800x600. *Descent II* produced 66.8fps at 320x240, 18.1fps at 640x480, and 11.6fps at 800x600.

In these early days of Direct3D, it's much too early to crown the ultimate 3D graphics accelerator. There aren't any unbiased benchmarks, and the few games available across a number of different platforms—such as *MechWarrior 2*—have been tweaked specifically for those platforms, not for Direct3D. Until the market matures a little, we'll have to rely on our own, necessarily subjective observations and whatever off-the-record remarks we can squeeze from game designers and other sources.

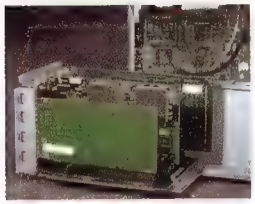
From what we've seen and heard, PowerVR looks

Compaq's ambitious 8710 delivers impressive design, performance and features.

very promising. The bundled version of *MechWarrior 2*, for instance, looks spectacular. Compaq will also be bundling a PowerVR version of *Flight Unlimited*, although that game wasn't available for review at press time.

Interior Design

You access the 8710's insides by removing a set of relatively exotic Torx screws and sliding open a sheet-metal side panel to expose its components. Most mini-tower systems achieve their



The 8710's card cage makes upgrades a breeze.

diminutive stature by placing their expansion slots on a riser card. The Compaq-designed motherboard in the 8710 features a riser card that's housed in a huge steel cage. It's a sturdy design, no matter how odd it may look or feel to rip the guts out of your computer every time you decide to add a component. Once the cage is removed, it's a piece of cake to add just about anything—from a new card to new SIMMs.

All the SIMM slots are occupied in the 32MB model. Only one of the three PCI slots is taken (by the NEC PowerVR card). The aforementioned sound card occupies one ISA slot and a 33Kbps fax/modem takes a second. (The modem is DSVD compatible and videophone-receive ready.) The chassis has two open, front-accessible 5.25-inch drive bays available. Although there are no components that use them, the 8710 offers two USB ports.

Exterior Decorating

Viewed from the front, the 8710 looks like a cobra preparing to strike. The odd-looking hood adorning the faceplate doesn't serve much of a purpose, but it adds an extra inch of width to each side. Compaq plays it conservative in terms of its color scheme, although they did go with a two-tone beige this time. Other aspects of the system's industrial design are much more functional. The entire case tilts up at a slight angle, so the drives are easy to access even if the computer is sitting on the floor. The grooves that dip into the top of the case, for example, hold five CD-ROM jewel cases. What a great idea for space that might otherwise be wasted (although I still don't like the dome-shaped top that prevents me from stacking things on top of the case).

The LED that lights when you have voicemail waiting renders an increasingly common feature of multimedia PCs more useful, but Acer's inclusion of a telephone handset is an even better idea. A moon-shaped LED lights when the system goes into power-save mode. The machine has a rapid-resume feature that all but shuts the system down after a designated period of inactivity. Punch the moon and you can start working right where you left off in a matter of seconds.

A second set of buttons on the hood are provided for controlling audio CDs (Play/Pause, Skip Forward, Skip Back, and Stop). This attention to detail makes it all the more annoying that the CD-ROM drive doesn't have a headphone jack and volume control on the faceplate. (To its credit, Compaq chose a drive with a standard faceplate, so you won't have any "fit" problems when you upgrade. The company also deserves praise for using heavily shielded digital-audio cables.) The right speaker has a headphone jack on its rear panel, but no volume control. Compaq's monitor has a volume control knob, but it doesn't affect the volume if you reboot into DOS. But, can you imagine making your monitor choice based on presence or absence of a volume control?

Compaq turned to Harmon International to design the JBL Pro Audio speakers that come with the 8710, and they are excellent. A 10-watt-per-channel amp powers a pair of satellites, each with a 3.5-inch woofer and a 10mm tweeter. The subwoofer consists of a 5.25-inch long-throw driver powered by a separate 10-watt amp. The speakers handled everything thrown at them and put out great sound. If only they had a volume control...

Peripheral Concerns

The 8710's hard drive scored a respectable Disk WinMark rating of 1,080K/sec, and the 8x CD-ROM drive reported an average data-transfer rate of 725K/sec—also respectable, but not spectacular.

The keyboard that Compaq ships with the system isn't nearly as impressive. It shares the same cobra-hood look as the mini-tower and feels as though its keys are sunk at the bottom of a well. The strangest thing about the keyboard, however, is the weird split they've put on the backspace key. The left half of the spacebar has been reconfigured as a backspace key that's guaranteed to drive any touch typist bonkers. The ThrustMaster programmable gamepad that Compaq includes with each system, on the other hand, is definitely a good value.

The Presario 8710 offers plenty of power, top-drawer components, and room for expansion. The InterWave-based sound card is great for many applications, such as producing your own music, but it's a whole other kettle of fish when it comes to strict Sound Blaster compatibility—and that's bad news for game players. Final judgment of its performance as a 3D gaming system, however, will have to wait until Direct3D has become more established. In the meantime, the look and play of the bundled 3D games is fantastic.

— *Michael Brown*

PRICE: $3,299
COMPANY: COMPAQ COMPUTER
PHONE: 800.345.1518
URL: www.compaq.com

boot verdict: 88%
That damn sound card

under the hood

the brains

CPU	200MHz Intel Pentium
External Cache	512K pipeline burst
RAM	32MB EDO DRAM (128MB max)
Video	S3 ViRGE, 2MB EDO DRAM; NEC PowerVR, 4MB SDRAM

the brawn

Hard Drive	2.5GB Western Digital
CD-ROM	8x Hitachi CDR-7930
Expansion Bus	3 full-length PCI, 4 full-length ISA
Fax/Modem	33.6Kbps full duplex speakerphone, DSVD fax/modem

the beauty

Speakers	JBL Pro Audio speakers
Case	Well-designed case with plenty of expansion considerations

3D Graphics Accelerators

The second wave

The market for 3D graphics is approaching critical mass, and the proof is in the number of 3D graphics accelerators coming into the bootLab. We've taken four of the latest cards—all of which happen to be at the low end of the price spectrum—and put them through their paces, evaluating their performance at accelerating 2D and 3D games and applications; DOS games, and Win 95 games. We also took a hard look at the titles bundled with each card, because until Direct3D-compatible software becomes more prevalent, only the bundled titles will take full advantage of each new card's silicon.

If you're wondering if all the hype about 3D is justified, the answer is a qualified yes. Done right, a 3D game can deliver an amazingly realistic, thoroughly immersive experience. *MechWarrior 2* is an excellent example; *Quake* is another (even though the first version of the game doesn't support *any* 3D accelerators). And don't forget the many applications that will benefit from speedy 3D, including CAD, modeling, animation, and VRML.

Of course, many grand promises were made about FMV when that technology first became feasible—and few were ever fulfilled. As with FMV, some 3D games will be all flash and no substance. In the end, however, 3D graphics accelerators will do more to expand the realm of possibilities than any other recent technology. But that's enough philosophy; let's see what these babies can do.

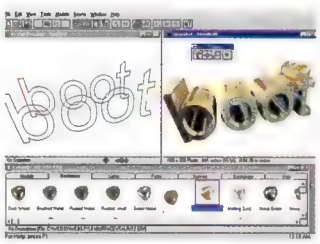
9FX Reality 332

Number Nine settled on the popular S3 ViRGE chip for its 9FX Reality 332, and backs it up with 2MB of EDO DRAM. The card supports 24-bit color at up to 800x600, 16-bit color up to 1024x768, and 8-bit color up to 1280x1024.

A feature connector on the card is provided for an upcoming hardware MPEG decoder module, but an excellent software MPEG decoder from MediaMatics is also provided.

DOS and Windows performance was solid, but not exciting. The 9FX delivered only 21.2 million pixels per second on Ziff-Davis' Graphics WinMark test (at 640x480 with 16-bit color depth). In terms of DOS performance, it cranked out a wimpy 16fps playing *Duke Nukem 3D* at 800x600 and 24fps at 640x480. *Descent II* clocked in with 19fps at 640x480.

Virgin Interactive's *Screamer*—a great 3D racing game that highlights the card's capabilities—is the best of the software shipped with the 9FX 332. You'll also find Reality Bytes' *Havoc* (a futuristic tank game) and a demo version of Terminal Reality's *Terminal Velocity* spaceship game. Both these titles are major letdowns. The graphics in *Terminal Velocity* aren't much better than they are in the nonaccelerated version. You'll see smoother texture maps, especially up close, but the most significant enhancement is the simple addition of fogging to obscure terrain in the distance. *Havoc* is actually less fun and less graphically appealing; it doesn't even offer any particularly impressive 3D. Snore.



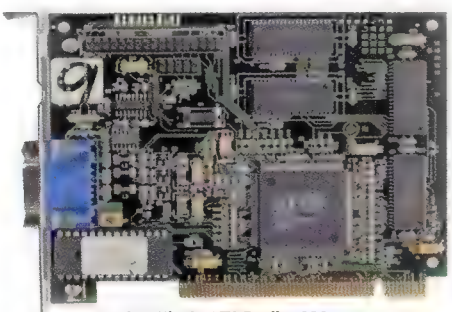
***Web3D* is an unusual and strangely cool tool included with Number Nine's 9FX Reality 332.**

On the application side, Number Nine bundles Asymetrix's *Web 3D* and a 45-day-trial version of *RealiMation STE*. Contrary to its name, *Web 3D* is not a VRML browser but a modeling and rendering program for building 3D Web pages. *RealiMation* is a 3D modeling package for constructing and animating other types of 3D environments.

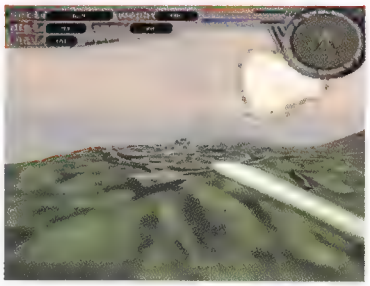
PRICE: $199
COMPANY: NUMBER NINE VISUAL TECHNOLOGY
PHONE: 800.438.6463
URL: www.nine.com

boot verdict: 80%

The WinMarks rank it last, but *Screamer* is a blast



Number Nine's 9FX Reality 332



***Terminal Velocity* on the Fahrenheit Video 3D looks little better than the original game.**

Fahrenheit Video 3D

Orchid Technology's Fahrenheit Video 3D also uses the S3 ViRGE chip and comes with 2MB EDO DRAM. Useful screen modes include 1280x1024 with 8-bit color depth; 1024x768 with 16-bit color; 800x600 with 24-bit color; and a cool 1600x1200-pixel, 8-bit color mode for resolution freaks with good eyes or huge monitors. The board has a feature connector that can be used either for a hardware MPEG decoder or a TV tuner card, but these options were not yet available for review.

The Fahrenheit performed well under Win 95, delivering a Graphics WinMark score of 24.1 million pixels per second (at 640x480 with 16-bit color depth), but its DOS performance was not as exciting. In our frame-rate tests, it scored identically to the Number Nine card (not surprising, considering they both use the ViRGE). Playing *Duke*, the card pumped out only 24fps at 640x480 and just 16fps at 800x600; it delivered *Descent II* at only 19fps at 640x480.

The bundled *XingMPEG* software MPEG decoder offers a full set of playback features and good visual quality, but its performance was marred by occasional crashes, especially when running in high res. We also noticed that the audio and video exhibited a tendency to fall out of sync, so that a number of the MPEG clips we viewed looked like poorly dubbed kung fu movies.

Orchid Technology's Fahrenheit Video 3D

Orchid's software bundle is disappointing. The best title was Gremlin Interactive's *Actua Soccer*, a game that features amazing 3D graphics, but clumsy gameplay. The motion-captured, texture-mapped, polygon-based players, however, look great and move realistically.

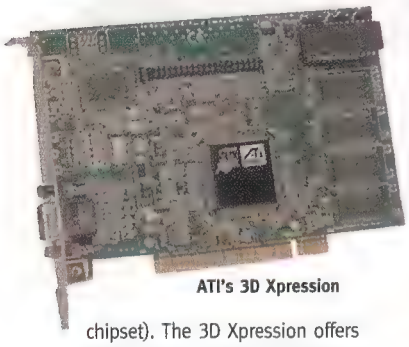
The game is interesting to look at, but not much fun to play. Orchid is also bundling *Havoc* and the same *Terminal Velocity* demo that Number Nine ships with its card.

PRICE: $239
COMPANY: ORCHID TECHNOLOGY
PHONE: 800.577.0977
URL: www.orchid.com

boot verdict: 70%
Poor price/performance ratio

3D Xpression

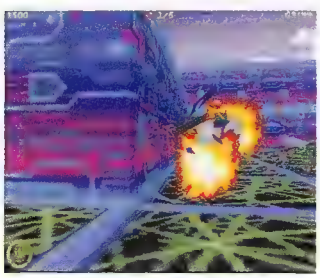
ATI's 3D Xpression is powered by ATI's own 3D Rage chip, a part that the company also OEMs to IBM (for the Aptiva C77) and NEC (for the PowerPlayer 2010, which also uses the 3Dfx Interactive Voodoo Graphics



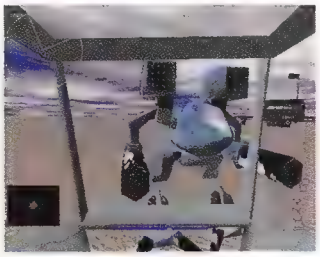
ATI's 3D Xpression

chipset). The 3D Xpression offers 2MB of EDO DRAM and supports resolutions including 800x600 with 24-bit color depth, 1024x768 with 16-bit color, and 1280x1024 with 8-bit color.

Optional TV-tuner and MPEG-decoder daughterboards are in the works, but ATI had not announced pricing or availability for these products at press time. The 3D Xpression's ability to play software-decoded MPEG video was startlingly good at every resolution and color depth. In addition to the typical drivers found with all these cards, ATI



***Assault Rigs* on the ATI 3D Rage card causes *Tron* flashbacks.**



***MechWarrior 2* never looked so good. Beauty, eh? Good job, ATI.**

is the only one to currently support OS/2 and several PC Unix variants.

ATI's software bundle was the best of the bunch, beginning with a gorgeous, 3D Rage-enhanced *MechWarrior 2*. ATI is also bundling a couple of Psygnosis titles originally released on the Playstation: the sci-fi tank game *Assault Rigs* and the futuristic racing game *WipeOut*. You'll also find Vream's *WIRL* VRML Web browser in the box.

Performance in DOS and Windows was also excellent; the card was surpassed only by Matrox's new Mystique. The 3D Xpression scored an impressive 26.9 million pixels per second on the Graphic WinMarks (at 640x480 with 16 bits per pixel). It delivered 30fps playing *Duke* at 640x480 pixels and 20fps at 800x600. Playing *Descent II*, however, the card managed only 19fps in 640x480 mode.

PRICE: $219
COMPANY: ATI TECHNOLOGIES
PHONE: 905.882.2600
URL: www.atitech.ca

boot verdict: 87%
Best-of-the-bunch in this price range

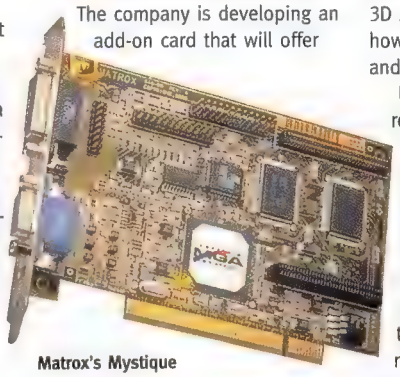
Mystique

When Matrox shipped its super-fast Millennium—with a tweaked version of *NASCAR Racing* in the box—the company found itself in a market that it wasn't ready to deal with. After droves of avid gamers began buying the Millennium, however, the company became hooked on that revenue stream. The Mystique is a direct result of that addiction.

The Mystique features Matrox's own MGA-1064SG 64-bit graphics chip and either 2MB or 4MB of SGRAM (Synchronous Graphics RAM). This single-ported memory architecture is faster than DRAM, and less expensive than VRAM or WRAM; but it's slower than VRAM or WRAM's dual-port architectures. (Matrox uses WRAM for the Millennium).

The 2MB card (user-upgradeable to 4MB) supports resolutions including 800x600 with 24-bit color depth, 1024x768 with 16-bit color, and 1280x1024 with 8-bit color.

The company is developing an add-on card that will offer

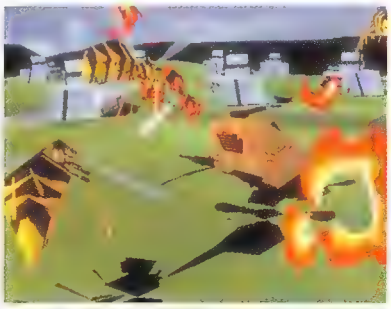


Matrox's Mystique

MPEG-1 decoding plus NTSC video in and out, so that you can capture video to your hard disk or output video to a composite monitor. Matrox is also working on a TV-tuner daughterboard.

DOS and Windows performance was easily the best of the bunch. The Mystique racked up a very impressive 27.3 graphic WinMarks. Running *Duke* at 800x600, the card pumped out a dizzying 29fps; at 640x480 it scored 37fps. Running *Descent II* at 640x480, the card put out 29fps.

When we evaluated the Mystique, Matrox had not received final versions of the games they intend to bundle with it. We did check out a beta version of Virgin's



Matrox bundles the other-worldly *Scorched Planet* with the Mystique.

Scorched Planet, a sci-fi flying game featuring some impressive-looking dragons. Matrox also plans to bundle custom versions of *MechWarrior 2*, Psygnosis' *Destruction Derby 2*, and a demo version of *Thunder Truck Rally*.

In terms of applications, you'll find a copy of Vream's *WIRL* VRML Web browser and CompCore Multimedia's *SoftPEG* MPEG player. At 800x600 resolution, the quality of MPEG video on the Mystique was at least as good as it was on the 3D Xpression. At higher resolutions, however, video became slow and jerky.

Unlike the other cards in this review, the Mystique doesn't support fogging. Matrox says its card can deliver similar results using lighting tricks, but this could pose a problem for Direct-3D software that counts on having fogging support in hardware. If such software isn't written to take the Mystique into account, it might run with fogging turned off or it might not run at all.

PRICE: $199 (2MB RAM); $279 (4MB RAM)
COMPANY: MATROX
PHONE: 514.969.6320
URL: www.matrox.com/mga

boot verdict: 84%
A 2D rocket with a foggy 3D future

Anticlimax

Even though this is the second wave of 3D graphics accelerators to come to market, we found none of them sufficiently impressive to earn our coveted Kick-Ass Product award. ATI's 3D Rage card came close, with excellent performance in DOS and Windows and a great software bundle, but we'd like to see a version with 4MB of RAM for additional levels of resolution. If you're looking for budget-priced 3D acceleration, this is the card to buy.

Fortunately, this segment of the market is growing rapidly, and more powerful chips are coming soon (see the 3D chip preview on page 66). We are eagerly looking forward to evaluating the *third* wave of graphic accelerators. Look for our next round of exhaustive reviews in the November issue.

— *Chris Dunphy*

H/W

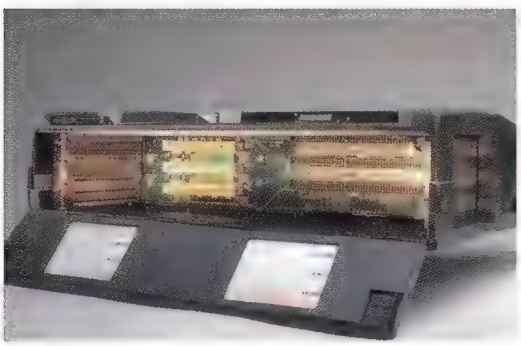
FieldWorks FW7633P

Ready for war

The FieldWorks FW7633P is cool. In fact, it's so cool it's practically frozen. You see, while some editors get to write their reviews from the sun-baked decks of sailboats, I'm sitting in the middle of a supermarket deep-freeze, surrounded by pints of Ben and Jerry's, banging on this laptop. I can barely feel my fingers, but duty calls.

FieldWorks designs computers for harsh environments—and I'm not talking about a network game of *Quake* (although *Quake* death matches have been known to reduce our office to a war zone). The FW7633P is designed to operate in temperature extremes ranging from 5 degrees F to 122 degrees F—from the Arctic to the Sahara. It's weatherized against humidity and rain (up to four gallons per hour). The machine features a rubber-coated magnesium alloy chassis that's 10 times stronger than plastic. Its internal components are attached to the chassis with polymer/aluminum suspension mounts. Rated to withstand an intensity shock of up to 100Gs, the device survived an accidental drop from our three-foot-high workbench without a scratch. Yes, this is one tough computer.

That rugged skeleton would be little more than a conversation piece if it wasn't protecting some powerful guts, and the FW7633P doesn't disappoint. Enhanced configurations are available, but the unit we reviewed consisted of a custom motherboard with a 133MHz Intel Pentium, 512K of pipeline burst cache, an Acer Labs core-logic chipset, 16MB of DRAM expandable to 128MB, and a 540MB Hitachi hard-disk drive. Video is handled by a Cirrus Logic 7543 video chipset with 1MB of DRAM. Pop open the door that runs along the back of the computer, and you'll discover a shallow bay containing three PCI slots and three ISA slots offering nearly all the expansion options of a desktop machine. I/O ports for a mouse, keyboard, and external monitor are located on the side of the chassis and are covered with removable rubber covers.



Equipped with three PCI slots and three ISA slots, this portable features more expansion capabilities than some desktop machines.

A Field MousePad on the right side of the keyboard functions as both a trackpad and drawing tablet/signature pad—perfect for tracing the route of your next secret mission. Both the trackpad and the keyboard are sealed against dust, moisture, and—presumably—Agent Orange. A secret compartment beneath the keyboard harbors a custom TEAC 4x CD-ROM drive.

In our performance testing, the FieldWorks posted unremarkable results. The system scored only 6.01 million pixels per second on the Graphics WinMark (at 640x480 with 256 colors), and the Hitachi 540MB hard drive scored only 181K/sec on the Disk WinMark. The customized TEAC 4x CD-ROM drive also scored low, posting only 231K/sec on the CD-ROM WinMark 96 test. You can avoid these disappointing results by ordering a high-performance motherboard.

Tipping the scales at 14.1 pounds (including the built-in handle), the FW7633P is closer to being a portable computer than a laptop. In fact, some of the components you'd expect to be bundled with a laptop are optional equipment with this machine, including its lithium-ion battery (which mounts on top of the computer, not inside). Of course, when you're in your Hummer cruising the bush (or the desert, or the frozen tundra), the included cigarette-lighter adapter might prove handier than a battery that depends on AC for recharging.

The FieldWorks FW7633P is the perfect computer for infiltrating enemy territory.

As you might expect, this portable big-iron doesn't come cheap. The configuration we tested, which included a gorgeous and incredibly bright 10.4-inch active-matrix display (perfectly readable in full sunlight), sells for $9,495. That's a hefty price tag for most of us, but it's small potatoes for well-heeled hackers, secret agents with unlimited expense accounts, and government agencies with a penchant for dropping more cash on door hinges and toilet seats.

— *Bryan Del Rizzo*

PRICE: $9,495
COMPANY: FIELDWORKS
PHONE: 612.947.0856
URL: www.fieldworks.com

boot verdict: 82%

Green Beret on the outside; grunt on the inside

under the hood

the brains

CPU.....133MHz Intel Pentium
External Cache.....512K pipeline burst
RAM.....16MB DRAM
Video.....Cirrus Logic-7543 PCI, 1MB DRAM

the brawn

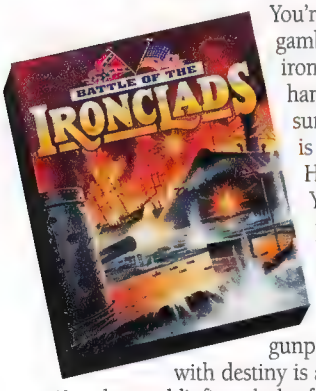
Hard Drive.....540MB Hitachi
CD-ROM.....TEAC 4x
Expansion Bus.....3 full-length PCI, 3 full-length ISA
Chassis.....Magnesium alloy

the beauty

Display.....10.4-inch active-matrix display

TEST YOUR METTLE!

An accurate, riveting first-person simulation of the Civil War battle between the Monitor and the Merrimack, America's first clash of Ironclad warships.



You're captain of the Merrimack, the Confederacy's gamble on future technology: a seemingly indestructible ironclad warship. Union gunfire bounces harmlessly off your metal sides. You've rammed and sunk the wooden warship Cumberland; the Congress is scorching the late afternoon sky. The waters of Hampton Roads are littered with bodies and debris. You're bearing down on the ailing Minnesota for your third kill of the day.

Hidden in the shadows of the foundering Minnesota is the Union's version of an ironclad, the Monitor. Smaller and more maneuverable, but with less gunpower, your nemesis awaits. Your epic appointment with destiny is about to begin. The greatest naval battle of the Civil War: the world's first clash of two IRONCLADS.

View From The Monitor

These exciting features put you right in the middle of the action!

- Historical detail enriched by actual logs, notes and letters
- Battle scenes recreated from historically accurate maps and charts
- Multiple modes of play
- Full 3-D reconstruction of both ships based on original blueprints
- Live actors in accurate period costume
- Simple, uncomplicated interface

GROLIER INTERACTIVE INC.

Grolier Interactive Inc. Danbury, CT 06816
(203) 797-3530. Internet: http://www.grolier.com

CD ROM

S/W

Frank Thomas Big Hurt Baseball

Out of the park for arcade-style fans; a fielder's choice for purists

The field is crowded when it comes to baseball sims and to really stand out you need something extra.

Chisox slugger Frank Thomas stands out amid the inanity that is Major League Baseball with his combination of intimidating proportions and friendly demeanor.

Plus, he hits the ball *real* hard.

Unfortunately, his *Big Hurt Baseball* sim is not a round-tripper. But, for most fans of the game, it should at least get on base.

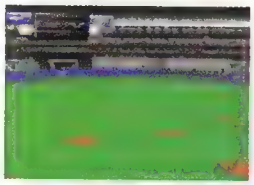
Like the Seattle Mariners, with Griffey, Buhner, and Johnson, *Big Hurt Baseball* features the good, the bad, and the ugly when it comes to graphics. The goods deliver motion-captured players and all 28 real ballparks from the bigs. It's bad when uniform details, like a red stripe down the pant leg of the beloved Dodger blue, are disregarded. And while Acclaim claims the graphics are 640x480, the lack of antialiasing on the batter looks 320x200. And that's ugly.

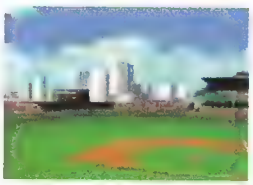
Gameplay is engaging however, and computer-controlled players make the sort of decisions you'd expect their real-life counterparts to make. Outfielders back up throws in the infield, but won't even get out of a crouch to chase a long ball they know is going out of the park (an homage to Barry Bonds, I'm sure). And a lot of balls do go park. In my season, Jim Thome had 10 homers by the third game of the year, and the Tribe had more than 30 combined.

When you tire of parking pitches over the wall, whip out a bunt and advance the runner.

Season mode is the payoff for the purist, and it's here that *Big Hurt* delivers... *the whiff!* First off, roster changes can't be saved from game to game. Strike one. Opposing player's stats are from the entire previous season, not to-date in the season you are playing. Strike two. No league leaders screen. Strike three.

The motion captured fielding in *Big Hurt* is true to big-league action, especially in the infield where, with a little pepper, you can turn the rare 6-4-5 double play.





The ballparks in *Big Hurt* are generated with such attention to detail that it's like a virtual tour of these baseball landmarks.

Frank Thomas is the only player whose image actually appears in *Big Hurt Baseball.* All the other players, from Canseco to Cora, share the same screen image.

The stair-stepping that occurs, particularly with the batter's graphics, detracts from the otherwise very natural imagery.

> Outfielders back up throws in the infield, but won't even get out of a crouch to chase a long ball they know is going out of the park...

Stats, in general, are not *Big Hurt*'s strong suit. While the game features 27 statistical categories and simulated 1995 numbers from Bill James' Stats Inc., purists will be disappointed. After a game, the box score only covers the line; showing the scoring by inning, total runs, hits and errors, and winning and losing pitchers. Purists want a total breakdown by player, like those found in the sports section of most newspapers.

Still, if it's action you seek, *Big Hurt* produces at the plate. The control is great. You have to judge a pitch at release. If it's a fastball, you'll have to get your lumber in motion early. If it's the change, check that wood and hold off 'til the right moment. With a keystroke you can pull the ball or push it to the opposite field fence. Base running is very dynamic and, with some experience, you can execute a suicide squeeze that would make Sparky Anderson proud.

At the end of the day, it comes down to whether you like your game arcade style or old style. *Big Hurt* comes through with the action, but comes up short on the details.

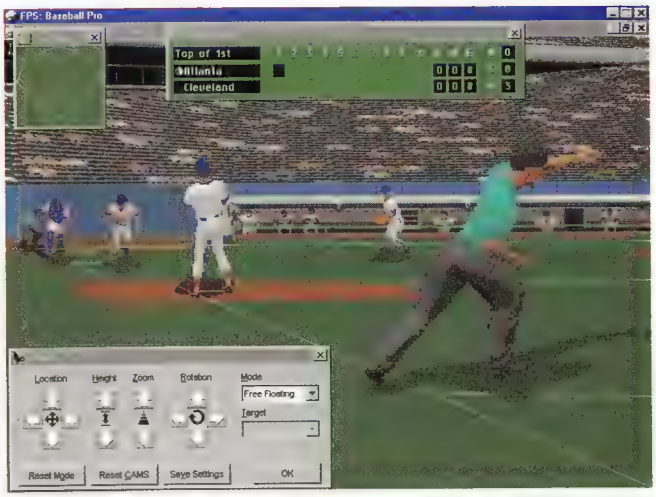
— Brad Dosland

PRICE: $54.95
COMPANY: ACCLAIM
PHONE: 516.759.7800
URL: www.acclaim.com

boot verdict: 72%
Twitch baseball extraordinaire

Front Page Sports Baseball Pro '96 Season

3D and the depth to fill it



Using *Front Page Sports Baseball Pro*'s Camera Angle Management System you can watch (and save) replays that even *Sports Illustrated* photogs would envy.

There are moments in *Front Page Sports Baseball Pro '96 Season* that surpass those found in the big leagues (but given the weak state of the game today, this is no longer much of a challenge).

Realism and detail are the order of the day, with a dose of user omnipotence tossed in for good measure. Any true baseball fan would love to study the ephemeral beauty of a perfectly turned play again and again, from every possible angle, to try and unlock the magic moments created by the game. *FPS Baseball Pro '96* makes that dream come true with its exclusive Camera Angle Management System (CAMS), which allows you to run the tape on any play from any point in the stadium.

You can watch Lofton squeeze a double out of a shallow outfield bloop from the mound, gaze at Ripken and Alomar turning a DP from 20 feet over the bag, stare incredulously at Cecil Fielder barreling in as you stand between him and home plate.

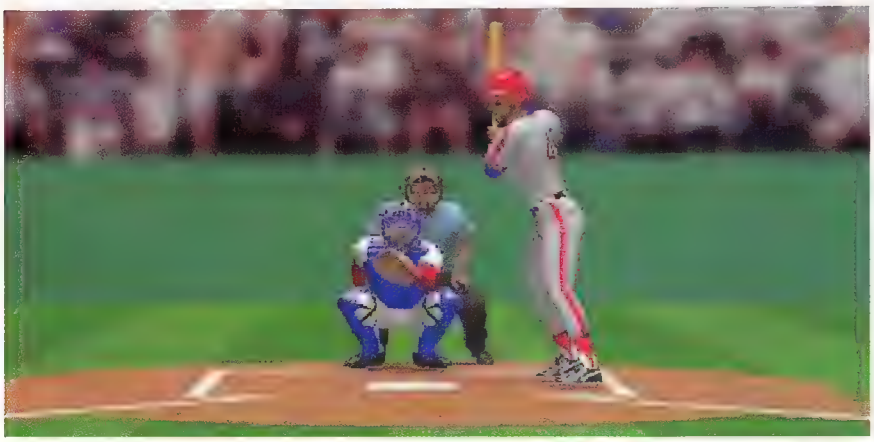
This magic is all made possible by the more than 11,000 frames of animated players (and umpires) whose motion-captured movements were fed into a mighty SGI/Wavefront workstation for meticulous rendering.

Details are really what distinguish *FPS Baseball Pro '96* from the pack. Massive quantities of stats jump at your every command, lining up in easily-printed charts for the most hardcore number junkie. And the entire *FPS Baseball Pro '96* world is editable, from the individual players to teams to leagues. Send your 3D squads onto the green to do battle in their editable uniform colors (three different togs, one each for home, away, and definable special days) on any of 28 big-league ballparks modeled after the real thing. At the end of the season, the computer even selects league MVPs, Cy Young award, and Rookie of the Year winners based on the stats piled up. It'll also recognize a triple crown winner, if one manages to survive the long, hard season.

All this power comes at a price, though. Initiating and managing a league requires the concentration of a dedicated war gamer (a feat not helped by the program's layered-menu approach). But your hard work is rewarded.

The only really distracting feature is the window that slaps you in the face when you start a game. Despite its 3D power, the pitcher/hitter interface falls back on a *LaRussa* style 2D "painting" in a 640x480 window that cannot be enlarged. This is particularly jarring when you cut to a 3D field of dreams every time the ball is hit, fair or foul.

Like all the info windows in the game's main interface, the batter/pitcher window can be positioned to your liking.



The cool polygon graphics of *Baseball Pro '96*'s intro cinema are how the actual game's batter/pitcher interface *should* have been.

While this game may not satisfy the Action Jackson seeking an *MLB Jams*-style game that sacrifices accuracy for action, the depth and detail will definitely score with anyone who recognizes the inherent beauty in the Game.

— Brad Dosland

PRICE: $54.95
COMPANY: SIERRA ON-LINE
PHONE: 800.757.7707
URL: www.sierra.com

boot verdict: 85%

Once the ball is in motion, it's 3D perfection

Power Goo

Bend reality in your hands

PowerGoo should come bundled with a guarantee that reads: "This box contains genuine smiles."

It has been a long time since I encountered a program that makes me marvel at a computer's ability to bend reality. While *PowerGoo* may not be as productive as past programs (Adobe *Photoshop*, MetaTools' *Bryce*, maybe even Fractal's *Poser*), they all share a common thread. Just as the best entertainment titles transport you to another world, these programs give you the ability to create and shape your world, and all with relative ease.

Kai Krause's software has always stressed simplicity and *PowerGoo* is no exception. After launching the program, you are presented with nine options. By clicking on the Goo Room, you're transported to a realm where you can run your fingers through reality like a shaman might run his through a sand painting. In the default Smudge mode, position your cursor on the face's eyebrows to raise them in surprise. Go to the corners of the mouth and lift them into an exaggerated smile. When you experience how effortlessly this is accomplished, and how astoundingly smooth the effect is, you too will wear that expression.

***PowerGoo* has many editing tools that are simple to use.**

Technically, *PowerGoo* is superb. The transformations you incur, ranging from Bulge to Smear to Twirl and more, are all accomplished in real time and a powerful interpolation algorithm polishes the pixel sand you smear about the screen so smoothly, the illusion of reality is preserved. You can work with files as large as your RAM will allow and in as many as 16-bit to 24-bit colors. Altered snapshots can be exported as BMP, Pict, and Photoshop formats, and you can even export QuickTime, AVI, or proprietary Goovie movies that capture the image's evolution.

The program ships with a library of images, including a collection of mug shots from world politics that includes personas ranging from Princess Di to Tricky Dick Nixon. You can load any BMP, PICT, Photoshop, TIFF, or PhotoCD image, from a variety of sources: clip art CD-ROM, online, desktop scanner. I've used the small camera built into my Nokia monitor, usually reserved for CU-See Me sessions, to check out what I'd look like with a variety of different nose jobs or a blond coif.

The program comes with a library of images and tools that let you shape your own creations.

A secondary aspect of the program is a pseudo-morph capability, which allows you to combine elements from various images. It's not a true morph, in that it does not calculate transitional images. Rather, it works more like the Clone tool in *Photoshop*.

Fusion is *PowerGoo*'s morph-style tool, which lets you combine two pretty faces.

Goo does have a Transitional tool, a slider in the lower left-hand corner of the interface, that allows you to gradually ease your distorted creation back into its natural state and forth to its twisted new look. These Jekyll and Hyde transitions make some of the best movies to export.

Just about the only thing missing from *Goo* is a multiple-level Undo command. My only other qualm is with the interface. All of Krause's programs (*PowerTools, Convolver, Bryce*) feature variations on the same "organic" interface that seeks to comfort the user by hiding the details of their choices behind abstract symbols. This is fine for casual dabblers, but these powerful tools are often in the hands of the more ambitious. The greater control allowed by an alternate interface that allowed specific parameter entry would benefit anyone serious about the program in anything more than an experimental manner. MetaTools' approach is evident in their decision to forgo a manual with the software, instead opting for a poster that explains the program. But *Goo* is so intuitive (and MetaTools *has* compromised a little and labeled some of the tools with actual words), that the poster is unnecessary.

The Mona Lisa is beautiful.

But *PowerGoo* enhances her features immeasurably.

PowerGoo is limited only by your own imagination. When you're done distorting faces and putting the political cartoonists of the world out of business, move on to scans of cars, landscapes, typography, whatever. The possibilities are endless.

— Brad Dosland

PRICE: $49.95
COMPANY: METATOOLS
PHONE: 800.972.4029
URL: www.metatool.com

boot verdict: 92%

Reality is putty in your hands

H/W

Falcon Mach V

Ssssmmokin'!

If you're a die-hard, kickin'-'til-you-drop-dead gamer, listen up. Falcon's Mach V will have you drooling more than a rabid pit bull. The Mach V is so powerful, you'll probably have the Mafia, the Yakuza, and a few Triads paying *you* for protection. Even Mikey likes it, and he hates everything. This system is *that* good.

The Mach V is customized for gaming performance. If you want specific components, Falcon Northwest will get them for you—if you don't, one of their techs will speak with you, discuss your needs, and custom-build a system.

The configuration we tested in the bootLab was impressive: 166MHz Pentium, Intel motherboard with Triton III core logic, 32MB of EDO RAM, Diamond Stealth 3D 2000 graphics accelerator with 2MB of EDO DRAM, 2.1GB Western Digital hard drive, and a Toshiba 8x CD-ROM drive. The system also came with all the gaming peripherals you could want, including CH Products' F-16 CombatStick, Pro Throttle, and speed-compensating game port. Rounding out the package were Altec Lansing's ACS-500 speakers with Dolby Pro-Logic surround-sound, and a 17-inch/0.26mm dot-pitch monitor from MAG Innovision. Phew!

The components are housed in a mini-tower case, which is butt-ugly but has a remarkably clutter-free interior. The motherboard's open expansion slots (two PCI, one ISA) were unobstructed by cables and easily accessed. There's only one open drive bay, however, so there's not much room for additional drives.

All of Falcon Northwest's systems are designed for optimal performance and gameplay; they scream power the second they're plugged in. Win 95 is optimally configured for native applications, and even the DOSSTART file comes complete with 16-bit drivers for the stalwart DOS user.

The benchmarking tests delivered impressive results. Using the Ziff-Davis benchmark suite, the Mach V scored 29.2 million pixels per second on the Graphics WinMark (at 800x600 with 16-bit color depth), and 1080K/sec on the Disk WinMark. The 8x CD-ROM scored high with a transfer rate of 803K/sec.

Testing a dedicated game machine forces us to play (um... test) games, and our *Duke Nukem* and *Descent II* tests revealed good frame rates. The Diamond Stealth 3D spits out 84fps while running *Duke* at 320x200, 24fps at 640x480, and 16fps at 800x600. With *Descent II*, the rates slipped to 63fps, 20fps, and 13.5fps, respectively. Pretty good scores, but not as good as we've seen the Matrox Millennium deliver.

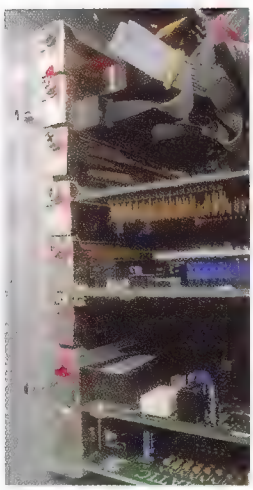
The ACS-500's are sweet. The imposing 18-inch-tall satellites and the beefy 10-inch sub-woofer are equipped with a Dolby Pro-Logic decoder, so if you're playing a game encoded with a Dolby Pro-Logic soundtrack (such as *Wing Commander IV*), you're in for a treat. Of course, the speakers sound good even without such fancy tricks. The combination of a Roland SCD-15 Sound Canvas daughterboard riding on a Sound Blaster 16 delivers uncompromising game compatibility and sound quality. Falcon Northwest loves the Roland card so much, they bought out the company's entire inventory when Roland decided to cease production. This is characteristic of Falcon's interest in providing the highest-quality components even though many game developers are abandoning MIDI soundtracks in favor of digital audio.

Because each Mach V system is tailored to an individual's needs, each system can be slightly different. (Falcon needs two weeks to fill an order, including a 72-hour burn-in.) But these guys understand your compulsion; they can relate to your cravings. When a system is delivered, one of the boxes holds a fully indexed binder containing technical support numbers, helpful hints, and the most specific details about the system (including hardware settings, device drivers, and IRQ reservations). Nice touch. The ominous sticker on the back, warning you about voiding the warranty if you crack the case, isn't as bad as it sounds. Falcon doesn't prevent you from customizing your system, but they do ask that you call and advise them of your plans ahead of time, so they can update their records should you need tech support or warranty repairs at a later date. The company goes a bit overboard, however, by painting the screw-heads and silicon-gluing the ribbon cables to the drives.

The Mach V just might be the only computer hardware you'll need. At least until next year.

— *Bryan Del Rizzo*

The Mach V comes with everything you need.



The screws are painted, so if you open the case or remove components, Falcon Northwest will know.

under the hood

the brains

CPU	166MHz Intel Pentium
External Cache	512K pipeline burst
RAM	16MB EDO DRAM (128MB maximum)
Video	Diamond Stealth 3D PCI, with 2MB EDO DRAM

the brawn

Hard Drive	2.1GB Western Digital
CD-ROM	Toshiba 8x internal
Expansion Bus	4 full-length PCI, 3 full-length ISA
Fax/Modem	33.6Kbps U.S. Robotics

the beauty

Display	MAG DX1795
Sound Card	SoundBlaster 16 with Roland SCD-15 Sound Canvas
Speakers	Altec Lansing ACS-500

Double Take

I DON'T KNOW WHAT BRYAN'S BEEN SMOKIN', BUT THE MACH V ISN'T THIS MIKEY'S IDEA OF A KICK-ASS SYSTEM. I RELISH THE THOUGHT OF COMMISSIONING SOMEONE TO DESIGN A SIGNATURE SYSTEM FOR ME, BUT I QUESTION SOME OF FALCON'S COMPONENT CHOICES. DIAMOND'S STEALTH 2000 3D, FOR EXAMPLE, WAS IMPRESSIVE WHEN INTRODUCED SIX MONTHS AGO; NOW IT'S OLD HAT. ALTEC'S ACS-500S ARE BOOTWORTHY SPEAKERS, BUT THEY HOLD LAST PLACE ON MY SHORT-LIST. AND WHAT'S UP WITH THAT MAG INNOVISION MONITOR? A SHADOW MASK TUBE? I DON'T THINK SO. SORRY GUYS, I'M JUST NOT IMPRESSED.

— *Michael Brown*

PRICE: $4,4400
COMPANY: FALCON NORTHWEST COMPUTER SYSTEMS
PHONE: 888.325.2661
URL: www.falcon-nw.com

boot verdict: 92%

So much power, so little time

S/W

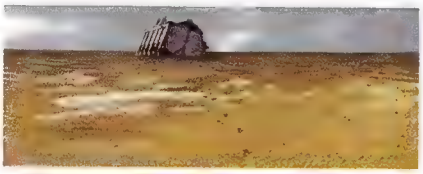
Eve

The quest for Paradise

Peter Gabriel and the late Helen Chadwick trade bon mots about the relationship between man and woman.

Interactive music can be powerful, and Peter Gabriel is one of the few artists who comprehends it. Fortunately, he also possesses enough clout to produce a genuine multimedia work (and not an electronic press kit).

Eve isn't about stroking Gabriel's ego, nor is it designed to help adoring fans understand the "real" Peter. And although there is some puzzle solving to be done, *Eve* isn't a game, either. Gabriel, in collaboration with visual artists Yayoi Kusama, Cathy de Monchaux, Nils-Udo, and the late Helen Chadwick, has produced a groundbreaking work of art.



Eve begins on a lifeless and desolate mud flat.

The premise is that Paradise has been lost and the world has turned to mud. This fall from grace is conveyed in an eerie video where an egg develops into a human figure, then cleaves into a man and woman. Your goal is to explore a series of four evolving landscapes and discover the hidden audio-visual surprises to bring man and woman back together to restore Paradise.

The landscapes, beginning with a desolate mud flat, are presented in a letterbox window that you can freely navigate in 360 degrees. Exploration means plenty of screen trolling, but the rewards—ranging from novel amusements to thought provoking commentary—are almost always worth it. Gabriel presents ideas in every way imaginable: simple text, video clips, talking heads, animation, voice-over, drawings—you name it.

The world of *Eve* is huge and filled with interesting people. A highly efficient compression algorithm renders the soundtrack much cleaner than you'd expect from audio that's been mastered with 16-bit resolution but only a 22.5kHz sampling rate.

The floral sculpture was designed by Helen Chadwick, one of four artists who collaborated with Gabriel in the production of *Eve*. Clicking on the insects triggers changes in the musical sequences.

> ... Paradise has been lost, and the world has turned to mud.

As you uncover clues in the landscapes, the environment is gradually restored with plant and animal life. A number of intriguing buildings also appear. The greatest payoff, is the opportunity to record custom mixes and produce music-video vignettes using Gabriel's songs "Come Talk to Me," "Shaking the Tree," "In Your Eyes," and "Passion." These productions can be saved and exchanged with anyone else who owns a copy of *Eve*. Unfortunately, Starwave doesn't offer a freely distributable player for the sequences.

There is nothing new about offering people the opportunity to remix songs, but previous attempts (most notably David Bowie's *Jump* and Prince's *Prince Interactive*) were laughable failures. Gabriel's *Eve* offers at least three approaches to the task, and each is startlingly effective.

Man and woman must be brought back together to restore Paradise.

In one mode, musical phrases are arranged in a grid with insects representing each phrase. In another mode, the insect phrases you've selected crawl over one of Helen Chadwick's floral sculptures. Clicking on an insect triggers the associated phrase. In another mode, you can play interactive music videos and trigger musical phrases and visual transitions by clicking on objects in the scene.

The number of phrases available to you depends on how far you've progressed in the game, but the number of phrases you can actually use depends on how much memory is available. By keeping each phrase memory resident, the sequencer is able to switch phrases immediately on the next downbeat, so the entire composition remains in step.

Eve makes *Xplora 1*, Gabriel's groundbreaking first multimedia effort, look childish. This is an important piece of work. If you love music, you must spend some time with this disc.

— *Michael Brown*

PRICE: $39.95
COMPANY: STARWAVE/ REAL WORLD
PHONE: 206.957.2000 011.44.1.225.743.188
URL: REALWORLD.ON.NET

boot verdict: 95%

Eve breaks new ground in interactive music.

H/W

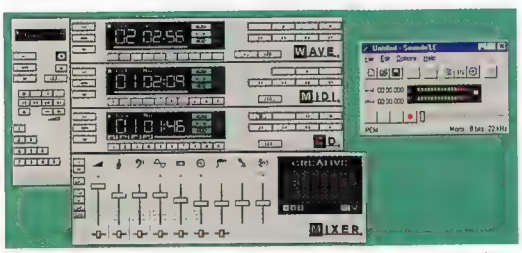
Phone Blaster 28.8 PnP

Nothing creative about it

When you're evaluating an expansion card, the phrase "all-in-one solution" is usually a tip-off for a lousy product. The device ends up being a classic jack-of-all-trades, master of none. Creative Labs tries hard to dodge that bullet by rendering the new Phone Blaster 28.8 PnP upgradeable, but the features that Creative chose to leave off the card are too important to do without.

We were surprised that the Phone Blaster offers a top speed of only 28.8Kbps, not 33.6Kbps. Creative was scheduled to ship a 33.6Kbps model in August, but the card wasn't available for review in time for this issue. Creative also planned to offer buyers of the Phone Blaster 28.8Kbps a firmware upgrade that would boost the card's modem speed to 33.6Kbps, but at press time, they had not decided how much they were going to *charge* for the upgrade. Talk about adding insult to injury.

But let's discuss the Phone Blaster's features. The card packs the functionality of three separate cards—modem, sound card, and CD-ROM drive controller—into a convenient, single-slot package (as if ISA slots are a rare commodity). However, it makes some compromises in achieving that integration.

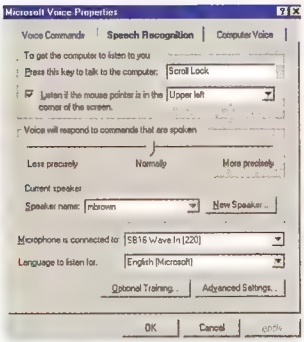


Creative Labs bundles its suite of audio recording and playback tools with the Phone Blaster.

The card's Rockwell R288ACI chipset offers data/ fax/voice functionality, but not simultaneous voice and data, so it's not a good choice for online gaming. The chipset doesn't support the H.324 standard, either, so the card doesn't support video teleconferencing. Onboard sound is produced by an ancient FM synthesizer, so it's not a good choice for games or music production. (You can buy a wavetable daughterboard.)

The Phone Blaster does support Win 95 Plug-and-Play, so it's a breeze to install. In fact, Phone Blaster delivers on every promise that Creative Labs makes for it. You can't bag the product for not performing to spec, it's just that Creative's target spec is so unambitious that this card really has nothing to recommend it.

— Lauren Guzak



Use Microsoft's *Voice* utility to control your computer using voice commands.

PRICE: $269.99
COMPANY: CREATIVE LABS
PHONE: 800.998.5227
URL: www.creativelabs.com

boot verdict: 55%

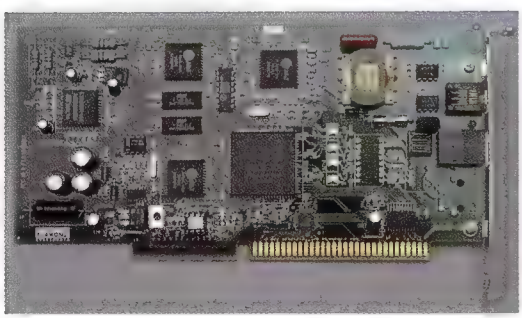
Well behind the curve

Supra NetCommander

Full speed ahead

Spend a few hours exploring the Web at 128Kbps on an ISDN line and you'll never want to go back to 33.6Kbps or slower.

Diamond's Supra NetCommander plug-and-play ISDN terminal adapter even takes the pain out of working with your phone company—the card's *AutoISDN* installation app walks you through the process of ordering ISDN service from your phone company and provides a list of ISPs that support ISDN. Start to finish, I had NetCommander installed in an ISA slot and running on a pre-existing ISDN line in less than 10 minutes.



The Supra NetCommander offers a simple means of utilizing ISDN for Internet access.

Designed for Win 95, NetCommander offers the standard features that make ISDN so appealing; primarily, blazing user-programmable bandwidth ranging from 56Kbps for a single B-channel to 128Kbps when bonded. As with all ISDN devices, voice and data are supported on both B-channels, so you can yak away while simultaneously sucking down huge game demos.

I tested the card with a couple of graphics-intensive overseas sites: *Scots* magazine (www.dcthomson.co.uk /mags/scots) in the UK, and *Geek Girl* (www.next.com.au /spyfood/geekgirl) in Australia. At both sites, I enjoyed peak-time transfer rates of approximately 2K/sec to 5K/sec (compared with .5K/sec to 1K/sec using a 28.8Kbps modem on an analog phone line).

NetCommander is basic: it includes only two ports—a BRI ISDN "U" interface and an analog POTS port—plus a status LED. The POTS port can support up to three devices at once (daisy-chained phone, fax, and modem, for example), and you can assign a distinctive ring to each of these devices. The card also supports multilink PPP. Bundled software is limited to Supra's quick-and-easy *AutoISDN* configuration/ monitoring utility and Microsoft's *ISDN Accelerator Pack* for Win 95.

Diamond offers telephone tech support, but you can also opt for online trouble-shooting via Diamond's ISDN Web support center (isdn-support.diamondmm.com). The user manual is thin and wrought with spelling errors, but you probably won't find much need for it because the card and software are so straightforward.

Until faster solutions, such as cable modems, reach the consumer market, ISDN will be the speediest telecommunications standard available. If you want ISDN, NetCommander is a simple, zero-footprint solution.

— Lauren Guzak

PRICE: $299
COMPANY: DIAMOND MULTIMEDIA
PHONE: 800.468.5846
URL: www.diamondmm.com

boot verdict: 86%

Inexpensive, simple, fast: lousy documentation

H/W

8x CD-ROM Drive-by

With this gang, the faster, the better

Having recently reported that many of the first generation of 8x CD-ROM drives were actually 4x drives pushed to the limit with accelerated clocks, boot's tech editors were eager to put these new internal 8x drives from NEC, Sony, and TEAC through their paces.

We installed and tested each of the drives in a generic 166MHz Pentium system with 16MB of EDO DRAM, a Diamond Stealth 64 PCI card with 2MB of VRAM, and a Creative Labs AWE-32 sound card. We used Ziff-Davis' WinBench 96 for benchmarks. Each of these drives delivered a different level of performance, but we can report that each of them is a true 8x drive.

Some of the results we encountered, however, returned eyebrow-raising results. We assumed the NEC's MultiSpin 8Xi—using NEC's SmartSCSI PCI interface card—would turn in the highest performance of the drives tested. Imagine our surprise when the drive's data-transfer rate was easily bested by those of TEAC's CD-58E, Sony's CSD-880E, and NEC's MultiSpin 8V ATAPI drives. (The 8V came in dead last in this particular test.)

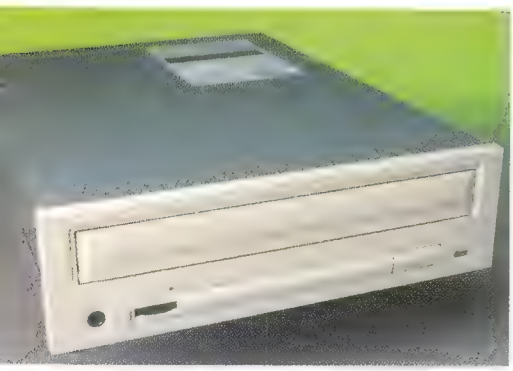
In terms of CPU utilization, on the other hand, NEC's SCSI drive turned in a stellar performance. Where the ATAPI drives hogged an average of 54 percent of the CPU's clock cycles to run video clips, the NEC SCSI drive consumed a comparatively minuscule 24 percent.

Even though these are 8x drives, don't expect to see 1,200K/sec average data-transfer rates; CD-ROM drives are capable of such speeds only when reading very large sequential files—streaming digital video, for example. In the real world, a drive will be used most often for accessing smaller files scattered across the disc. Data-transfer rates are important, but average access times are equally so. On the latter score, TEAC once again came out on top, with NEC's ATAPI drive bringing up the rear once again.

Check out our buying recommendations at the bottom *89.*

TEAC CD-58E (IDE-ATAPI)

TEAC's drive comes stock with an interface card and a skimpy user manual, but the drive is Win 95 Plug-and-Play compatible, so installation was quick and hassle free. There's really nothing special about the drive's general construction. Front-panel features consist of a headphone jack and volume control. If the drive had front-panel controls for playing audio CDs (forward, reverse, pause, and play), we might have given it a higher rating because it delivered such excellent CD-ROM performance during our benchmark tests.



The TEAC CD-58E delivered the best performance of the four drives we tested.

The CD-58E turned in a superior average data-transfer rate of 796K/sec, with an average access time of just 116ms (better than TEAC's claimed 125ms average access time). These numbers were significantly better than the rest of the field. But that performance came at a heavy price in terms of CPU utilization: The TEAC required a whopping 56 percent of the CPU's clock cycles to play video.

Should you buy this drive, we hope your installation was easy as ours, because TEAC provides only the skimpiest of user manuals, their telephone tech-support line is available only between 9 a.m. and 5 p.m. PST, and their Web site consists of an "Under Construction" banner. Still, you can't argue with performance, and if the unit serves you faithfully until you're ready to move up to a 12x drive, a DVD-ROM drive, or even a new PC, it's a worthwhile investment.

PRICE: $199.00
COMPANY: TEAC AMERICA
PHONE: 213.727.4860
URL: www.teac.com

boot verdict: 86%

Great performance; crappy docs

SONY CSD-880E (IDE-ATAPI)

Sony has been building CD-ROM drives for its OEM customers for years. This is the first time the manufacturer has marketed drives directly to consumers. Being the co-inventor of CD-ROM technology, you'd expect Sony to offer a well-built, high-performing drive—and the CSD-880E doesn't disappoint. Unlike the other drives we tested, this mechanism is completely sealed against dust—the drive doesn't have a single ventilation hole and its mounting-screw holes are tapped just deep enough for the screws.

Of course, good construction doesn't mean much without good performance. On this score, the CSD-880E took second place behind the TEAC in our testing, delivering an average data-transfer rate of 758K/sec and an average access time of 146ms (besting Sony's own claim of 160ms average access time, but falling short of the TEAC). The Sony was no prize winner in terms of CPU utilization, however, eating up 58 percent of the CPU's time to play video.

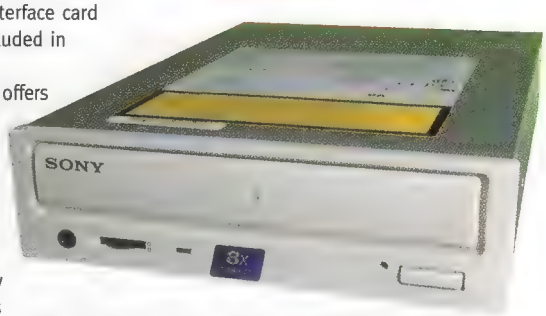
Installation was a breeze. The drive supports Win 95 Plug-and-Play and comes with an excellent installation guide and user manual. Front-panel features are limited to a headphone jack and volume control. A PCI IDE-ATAPI interface card and cables are included in the kit.

The Sony drive offers better construction than the TEAC and its performance is nearly as good. If you're looking to save a few bucks, check out the Sony CSD-880E, which is $40 cheaper than the TEAC CD-58E.

PRICE: $159.00
COMPANY: SONY COMPUTER PRODUCTS
PHONE: 800.352.7669
URL: www.sony.com

boot verdict: 83%

Excellent construction and price point



Sony's CSD-880E is built for reliability. The drive is impervious to dust because it doesn't have a single ventilation hole.

NEC MultiSpin 8V (IDE-ATAPI)

After manufacturing the very first double-speed CD-ROM drive, then following up with the first triple-speed, NEC's high-speed drives should be among the best. But this drive's performance turned out to be a mixed bag. Of the IDE/ATAPI drives, the MultiSpin 8V required the lowest number of CPU clock cycles for playing video, consuming 48 percent of the CPU's time, but its data-transfer rate was a wimpy 642K/sec. With an average access time of 146ms, the 8V beat out both its SCSI cousin and the Sony, but it was outclassed by the TEAC.

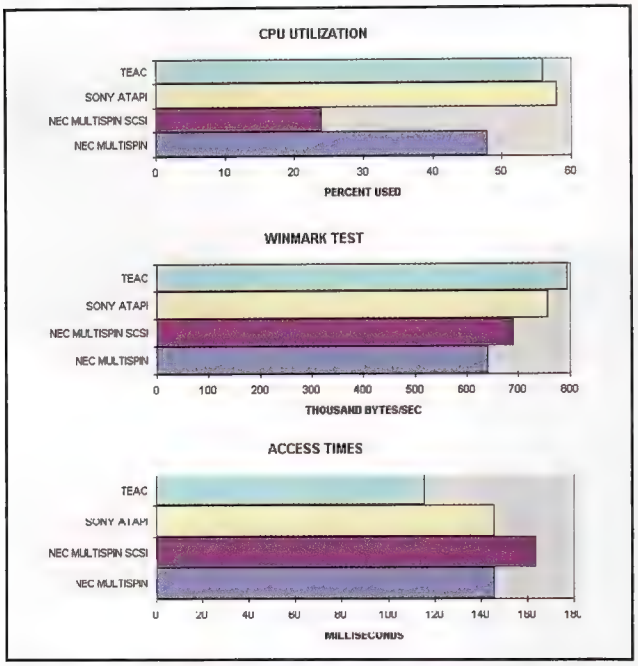
The 8V installed easily, with full support for Win 95 Plug-and-Play, and NEC's documentation—an installation guide and a user manual—was the best of the bunch. Front-panel features are limited to a headphone jack and volume control. At $149, the 8V is priced a full $50 less than the TEAC, but only $10 less than Sony's drive.

PRICE: $149
COMPANY: NEC
PHONE: 800.632.4667
URL: www.nec.com

boot verdict: 83%

Excellent price, but performance is underwhelming

NEC's MultiSpin 8V delivered the slowest average data-transfer rate of the four drives tested.



All of the drives were tested using WinBench 96 software. The WinMark test measures the data-transfer rates of the drives, so the higher the score, the better. On the CPU Utilization and Access Time tests however, a lower score indicates better performance.

NEC MultiSpin 8Xi (SCSI)

Although some might argue the point, SCSI is a far superior interface technology than IDE-ATAPI. SCSI offers more bandwidth, it supports more than just storage devices, you can link more devices on a SCSI chain, and so on. You'd think, then, that a SCSI CD-ROM drive would outperform an IDE/ATAPI drive any day of the week. But we simply didn't find that to be the case with NEC's MultiSpin 8Xi.

The drive delivered an average access time of 164ms (NEC claims it should perform at 140ms), but even that is far less performance than what we experienced with either the TEAC or the Sony drives. The average data-transfer rate of 691K/sec wasn't nearly as high as the TEAC and Sony drives, either; it was only slightly better than NEC's ATAPI drive.

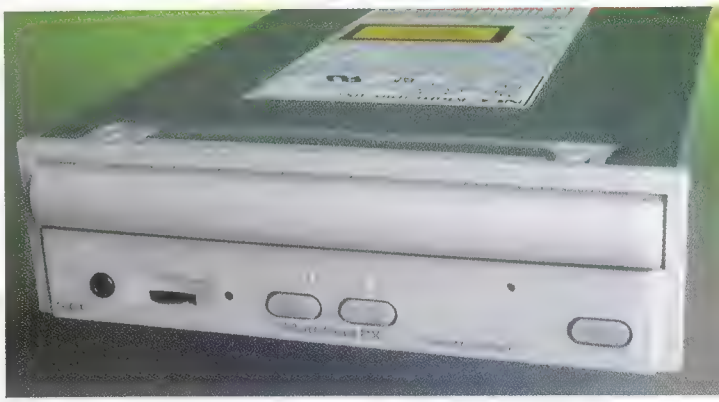
When it came to measuring CPU utilization, however, the 8Xi outclassed the rest of the field by an wide margin, requiring a mere 24 percent of the CPU's clock cycles to stream video. This is where a SCSI system clearly demonstrates its worth. The 8Xi was also the only drive we tested that included skip forward, skip back, and pause buttons for Audio CDs on the front panel in addition to a headphone jack and volume control. This is a feature *all* CD-ROM drives should possess.

NEC includes a Y cable for the power supply, a ribbon cable for the SCSI bus adapter, and a internal audio cable with the drive. Thanks to Plug-and-Play support, installation took less than five minutes. The user manual is well-written and in-depth, with coverage of installation, audio performance, SCSI termination, general information about SCSI, and troubleshooting. Priced at $349, NEC expects a considerable premium for this drive; a premium that doesn't seem justified by its performance as measured by data-transfer rate and average access time.

PRICE: $349.00
COMPANY: NEC
PHONE: 800.632.4667
URL: www.nec.com

boot verdict: 75%

Average performance, with a premium price tag



The NEC MultiSpin 8Xi SCSI drive was the least demanding in terms of CPU utilization, but its performance in other areas failed to impress.

But what would we buy?

If we had to pick our new drives from the field tested, we'd go with either the TEAC CD-58E for its performance, or the Sony CSD-880E for its construction. The NEC drives just left us cold. The MultiSpin 8V is the least expensive of the bunch, but its performance was mediocre at best. Thanks to the SCSI interface on the MultiSpin 8Xi, it demanded the least resources from the host computer, but its performance in other areas just doesn't justify its price premium.

— *Bryan Del Rizzo*

boot KICK-ASS! PRODUCT

Quake

It's enough

Jesus Christ couldn't live up to *Quake*'s advance billing. After all the hype, all the sneak peeks, all the "exclusive" behind-the-scenes reports, you'd think that id was about to deliver the Second Coming. The first time *I* saw the game I thought, "Yeah? So?"

Quake, I've decided, is an acquired taste. You have to get past the first level to accept the chunky graphics, the low-tech weaponry, and the monsters that move with the stiff-limbed grace of marionettes. Only then does the scope of this game's accomplishments slowly percolate into your consciousness.

Oddly enough, this realization starts with the amazing soundtrack by Trent Reznor and Nine Inch Nails. Audio cues are so well placed in the stereo spectrum that you'll often *hear* where a creature is hiding before it appears on the scene. At one point during a *Quake* deathmatch, one of my teammates was blown apart by a grenade, and I could *see* his body parts rain down on the bridge we were standing on, but I could *hear* his legs, trunk, and head splash in the water below when they bounced off the surface of the bridge.

Leave the CD in the drive when you launch the game, and the Nails' dark, industrial rock begins pulsing through your system. This isn't the thin, compressed-to-emptiness audio typical of most computer games, and it isn't the cheesy, synthesized sound of a MIDI audio track. This is full 16-bit/44.1kHz Red Book audio.

Next, you begin picking up the visual details: The real-time lighting effects that illuminate a dark room when a grenade explodes; the undulating visual distortion that overcomes you while submerged in a pool; the elegant stained-glass windows; the fountain of blood and organs erupting from an enemy when you attack with the power of a Quad Damage rune.

Finally, you notice the game's mastery of physics. Kill an Enforcer with a shotgun and chances are he'll fall to his knees before collapsing in a heap. Take him out with a thunderbolt and he might fly through the air before exploding into bloody pulp. Stand beneath one of the massive suction tubes in some of the advanced levels, and you'll be pulled into a vortex and dumped somewhere else.

Gameplay is simple: Explore a wild collection of gothic/industrial mazes—consisting of hallways, moats, ramps, catwalks, elevators, and secret rooms—and kill everything in sight. The game is haunted by a collection of nightmarish baddies, all of whom are constructed of texture-mapped polygons: big-and-stupid Grunts; grenade-tossing, chainsaw-wielding Ogres; razor-slashing Fiends, lightning-bolt-throwing Shamblers. But the Zombies are my personal favorites. These disgusting, undead creatures attack not with weapons or claws, but by stripping off and hurling chunks of their own rotting flesh. The little bastards are tough to kill, too. Take one out with a nail gun or lesser weapon and he'll simply drag himself back to his feet and come after you again. Blowing them apart with a grenade or rocket is the only sure way to kill them.

Quake doesn't live up to its hype, but no game could. The game has its flaws, but it is the most satisfying first-person action game of all time. And that's certainly enough for me.

— *Michael Brown*

Quake **features spectacular death scenes. In this case, an unlucky soul gets cut in half with a blast from a thunderbolt.**

Be wary of the Knights. They attack in groups and they have *long* swords.

The lava-monster endboss relentlessly hurls fireballs at your head.

Ogres have two weapons at their disposal: A chainsaw for hand-to-hand combat and a grenade launcher for distant attacks. Their pitiful faces make them look *compelled* to evil.

The emaciated Zombies are relentless attackers, ripping off their own flesh and throwing it at you.

PRICE: $39.95
COMPANY: ID SOFTWARE
PHONE: 800.434.2637
URL: www.idsoftware.com

boot verdict: 97%

Invest in this bloodfest

S/W

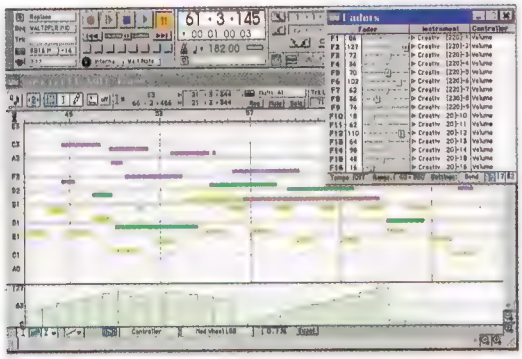
Vision for Windows

Musical migration

Opcode Systems, a leading-edge developer of music software for the Macintosh, has jumped into the PC market in a big way with the release of *Vision for Windows*. This high-end MIDI sequencer contains all the power and versatility that has kept *Vision* a perennial favorite among musicians.

Vision offers a raft of features, but the digital audio tools found in *Studio Vision*, Opcode's flagship Mac product, are not among them. This isn't a shortcoming unless you're among the select few musicians engaged in hard-disk recording; no sense in paying extra for functionality you can't use. *Vision* does support an unlimited number of sequencer tracks; resolution of 480 pulses per quarter note; support for MIDI Machine Control; assignable automated mixing consoles; and support for external sync sources, including SMPTE time code. *Vision* also accommodates a variety of composition styles. You can work in a traditional track-based linear style or you can save entire sequences as "subsequences" and combine them in various ways for pattern-based compositions.

Vision's recording features are extensive. You can opt to have a recording replace or merge with pre-existing material on a track, for example. The same options are also available when step-entering notes from a MIDI keyboard, during punch-in recording, and when copying and pasting between tracks. Combine *Vision*'s Loop recording feature with its Merge option and you can lay down a pattern and then play it back while you record another pattern on top of it, merging the two and making the track more complex with each successive loop.



***Vision*'s Graphic window lets you view several instruments at once—each in a different color. Beneath the notes, the Strip Chart shows various types of MIDI data in graphic form. In the upper right, the Faders window provides up to 32 additional MIDI controls.**

Recorded tracks appear in the Tracks window as miniature piano-roll displays, each in a different user-definable color. You can drag the tiny displays left or right to change their start times or copy and paste between them. Drag with the Alt key down and the original stays put and a copy gets dragged. A handy Scrub feature lets you hear the sequence at any tempo, forward or backward, by dragging the mouse.

Vision's Graphic window offers a full size piano-roll display with all the features you'd expect in a professional sequencer. You can select notes in a variety of ways and change their characteristics by dragging them up and down or left and right. Clicking on the right side of a note lets you change its duration by dragging with the mouse. Shift-clicking lets you select non-contiguous notes—a great tool for selective editing. A Pencil tool lets you insert notes anywhere on the grid.

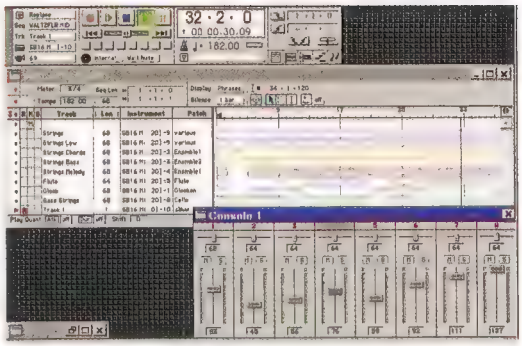
The Strip Chart beneath the piano-roll graphically displays velocity, aftertouch, pitch bend, and other types of MIDI data. You can insert new data and edit old data by drawing lines and shapes directly onto the chart. In *Vision*'s Notation window, you can view, edit, and print your music in standard notation using most of the same editing options.

Vision's alphanumeric List window enables you to view your MIDI data chronologically. This is great for quickly editing event parameters, because you need only click a value and drag it to make changes.

Other features include a sophisticated Quantize window offering several options for correcting note placement including: sensitivity, strength, offset, swing, and randomization. Use these tools with traditional grid-style quantizing, or with *Vision*'s Groove Quantizing function, to give your tracks a "live" feel. The program even includes a nondestructive playback-only quantize feature that lets you audition different quantize options before committing to a change.

Vision is a robust package with a long list of features. Although the user interface has a few awkward spots and requires some setup time to get started, the program works smoothly and quickly once you're used to it. If you want to record and edit MIDI files like the pros, you should definitely check out *Vision*.

— *David M. Rubin*



***Vision*'s Track window shows recorded data in tiny color-coded piano-roll displays. One of *Vision*'s four automated mixing consoles is shown below the tracks.**

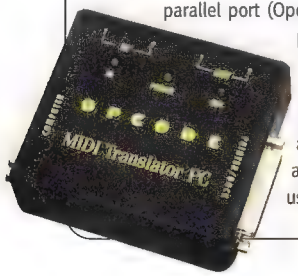
David M. Rubin *owns a computer-music studio in the Los Angeles area where he composes for film, video, and multimedia. His latest book,* The Desktop Musician, *is available from Osborne/McGraw-Hill. You can reach him at DMRubin@aol.com*

PRICE: $299.95
COMPANY: OPCODE SYSTEMS
PHONE: 800.557.2633
URL: www.opcode.com

boot verdict: 90%

Powerful tool for professional-caliber composition

Opcode MIDI Translator PC



Add any external MIDI devices—such as piano-style keyboards or sound modules—to your computer and you'll need a MIDI interface. Opcode's MIDI Translator PC ($129.95) is about as simple and unobtrusive as these devices get. The 3x4-inch black box connects to your parallel port (Opcode includes a cable) and provides a pass-through port for your printer. The MTPC provides 32-channel capability with 2 MIDI Ins and 2 MIDI Outs. An exclusive "docking" port lets you add a second unit for 64-channel, 4-In/4-Out capability.

Red and green LEDs on the unit's top panel indicate MIDI In and Out activity, and a yellow LED lights up when the power adapter is plugged in. (External power isn't required unless you use the pass-through or piggyback two modules.) — *D.R.*

Hellbender

More of the same

This camera view gives you a perspective from the outside of your spacecraft.

Hellbender, the sequel to *Fury*^{3}/*Terminal Velocity*, hits all the gaming technology hot buttons: Direct3D support for 3D graphics acceleration; DirectPlay for multiplayer gaming over a LAN, modem, or the Internet; a voice-over track by *The X-Files*' star Gillian Anderson; and a CD-quality rock 'n' roll soundtrack. But all that glitters is not gold, and all the sparkling technology and star power in *Hellbender* can't disguise the fact that this is little more than a prettier version of what was only an average game to begin with.

Hone your dogfighting skills against these Bion fighters.

Many hardcore *X-Files* fans will be attracted to *Hellbender* solely because of Anderson's contribution as the game's narrator and as the voice of the ship's computer, E.V.E. (Enhanced Virtual Reality). Unfortunately, Anderson's performance in both roles is so uninspired that you have to wonder if they didn't just hand her the script, pull her into a studio, and record her very first reading.

To be fair, developer Terminal Reality *has* improved the game's graphics for this iteration. This is particularly noticeable when the game is running on a 3D graphics accelerator with the real-time lighting and environmental effects (rain, lightning, and snow) activated. The game's premise and gameplay, however, are virtually identical to the original: The evil Bions are trying to take over the universe and you're the only thing standing in their way.

Hellbender's graphics just aren't enough to set it apart from a host of similar titles. This game is strictly for die-hard *Fury*^{3}/*Terminal Velocity* fans who have upgraded to a fast 3D graphics accelerator.

— *Francis Kong*

PRICE: $44.95
COMPANY: MICROSOFT
PHONE: 800.426.9400
URL: www.microsoft.com

boot verdict: 63%

Fury to the fourth

Z

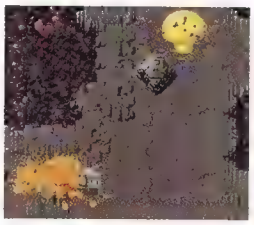
boot KICK ASS! PRODUCT

War is hell

Z puts a Bill-and-Ted-style twist on war sims such as *Command & Conquer*. The game's animated cut scenes, featuring a pair of party lovin' robots named Allen and Brad and their hard-ass commanding officer, General Zod, are hilarious. Strung together, they would make a great buddy film.

Gameplay consists of commanding robot troops in a series of capture-the-flag sequences. *Z*'s battlefields are surprisingly small, which makes the action brief and intense; especially in multiplayer games (either head-to-head or with up to four players over a LAN). Your soldiers include Grunts (footsoldiers), Snipers (long-range sharpshooters), Psychos (nutcases with little regard for personal safety), and more. You also have an inventory of artillery, assault vehicles, and tanks (but no planes), and a factory for churning out more robots and equipment.

If you're man enough you can play Rambo-style, blowing off the territory capturing assault vehicles and going straight for your enemy's fort.



Kaboom! The custom A/I considers a soldier's intelligence even when he's in an assault vehicle.

Once you've captured a territory, you must decide what you want to make of its assets. Smart robots and tanks take longer to manufacture than less-intelligent robots and jeeps. Do you have the time?

Aside from one important flaw, *Z*'s A/I is damned impressive. Play against the computer and you'll notice the enemy exploits your weaknesses instead of executing the same predictable routines. Even better, vehicles adopt the characteristics of whichever 'bot is driving them. The flaw in the A/I appears only occasionally, when your troops take a maddeningly circuitous route to their assigned target.

Visually, *Z* is surprisingly unimpressive for a game that supports SVGA graphics. The small window in which your troops appear to deliver their perspective on the battle, however, is always good for a laugh.

Z is one of those rare titles you'll buy for its gameplay, but love for its cut scenes.

— *Doug Lombardi*

PRICE: $49.95
COMPANY: VIRGIN INTERACTIVE ENTERTAINMENT
PHONE: 800.874.4607
URL: www.vie.com

boot verdict: 90%

Addictive and sophisticated

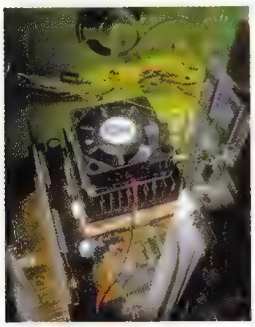
H/W

The Polywell P-166CX

A new breed of speed

At first glance, the Polywell P-166CX looks like a run-of-the-mill computer. It acts like a run-of-the-mill computer, too. But although things seem familiar, your sixth sense tells you there's something different about this machine.

Your first clue is that the "Intel Inside" sticker is missing. You see, the brains of this beast hail from Richardson, Texas, not Santa Clara, Calif. Crack the case, hunt down the CPU—it's easy enough to find, beneath that massive heat sink and cooling fan—and you'll discover a Cyrix 6x86 processor, not our old, familiar friend the Pentium. The Cyrix chip has a clock speed of 133MHz, so why does Polywell describe its machine with a P166 in its moniker? Cyrix claims that its 133MHz chip performs at least as fast as a 166MHz Pentium, thanks to optimizations in its architecture.



Polywell keeps the Cyrix 6x86 cool with a massive heat sink and a CPU fan.

These improvements, according to Cyrix, include an on-chip floating point unit to optimize both 16-bit and 32-bit applications, register renaming (providing temporary data storage without having to wait for the CPU to access the on-chip cache or main system memory), and super pipelining (increasing the number of pipeline stages to avoid program execution stalls). With Intel's MMX on the horizon, you're probably wondering about this chip's future. Cyrix is thinking about it too, and they've already announced the next version, code named M2 (an unfortunate choice of name, bearing no relation to 3DO's M2 game system project). M2 will be MMX compatible, but more importantly, it will be pin compatible with motherboards designed for the existing Cyrix processor.

Surprise! The Polywell P-166CX (with a 133MHz Cyrix 6x86) equals the performance of many machines equipped with 166MHz Intel Pentiums.

In our benchmarking tests, the Polywell P-166CX delivered results as good or better than Gateway 2000's P5-166XL (reviewed in *boot* 01) and Falcon Northwest's Mach V P166 (see the review on page 85). Both of these comparison machines are powered by 166MHz Pentiums. The P-166CX pumped out a whopping 32.3 million pixels per second on Ziff-Davis' Graphics WinMark, thanks in part to its STB Lightspeed 128 graphics accelerator. The Lightspeed combines Tseng Labs' new ET6000 graphics controller with 2MB of Multibank DRAM.

The TEAC 6x CD-ROM drive also performed well, posting a CD-ROM WinMark score of 647K/sec while utilizing just 39 percent of the CPU's clock cycles. The Seagate 2.14GB EIDE hard drive posted an impressive Disk WinMark of 1090K/sec. The *Duke Nukem* and *Descent II* tests also produced good results: At 320x200, the system pushed 70fps and 80fps, respectively. At 640x480, performance dropped to a respectable 25.4fps and 32fps, respectively. At 800x600, however, the frame rates plummeted to just 12.8fps and 20fps, respectively.

Polywell turned to IBM's Mwave 2.0 DSP technology for its audio and telephony needs. Thus equipped, the Polywell offers a 28.8Kbps fax/modem, full-duplex speakerphone capability, and a digital voicemail system. The Mwave chip supports wavetable audio for both Windows and DOS, but it accomplishes this through digital signal processing, not ROM-based samples. Although IBM claims Sound Blaster Pro compatibility, we encountered audio problems with a number of DOS games, including *The 11th Hour* (no MIDI soundtrack), *Descent II*, (no digital audio effects), and *Angel Devoid* (no sound at all).

If you're interested in playing games such as these, you'd be better served by adding a dedicated wavetable sound card to the system and shutting down that functionality on the Mwave card. While you're at it, pick up a decent set of speakers. The Quickshot 600 Sound Force speakers that Polywell bundles with this system make better doorstops.

The Polywell P-166CX achieves a killer price/performance ratio by combining a dark-horse microprocessor with an average monitor (a Sampo 17-inch shadow mask), a cheap sound/telephony card, and godawful speakers. Fortunately, Polywell doesn't lock you into these components; you can swap out the peripherals for parts more to your liking.

— Bryan Del Rizzo

under the hood

the brains

CPU.....133MHz Cyrix 6x86-P166
External Cache.....512K pipeline burst
RAM.....16MB SDRAM
Video.....STB Lightspeed 128, 2MB MDRAM

the brawn

Hard Drive.....2.15GB EIDE Seagate
CD-ROM.....TEAC 6x internal IDE/ATAPI
Expansion Bus.....3 full-length PCI, 4 full-length ISA
Fax/Modem.....28.8Kbps

the beauty

Display.....Sampo AlphaScan 17mx
Sound Card.....Mwave
Speakers.....Quickshot 600 Sound Force Speakers

Double Take

WE SHOULD THANK OUR LUCKY STARS FOR COMPANIES-SUCH AS CYRIX-THAT POSSESS THE GUTS TO GO TOE-TO-TOE WITH GIANTS SUCH AS INTEL. IN THE ABSENCE OF ROUGH-AND-TUMBLE COMPETITION, COMPUTER INDUSTRY INNOVATION WOULD SLOW TO A CRAWL WHILE MONOPOLIST EMPIRES GROW TO BLOATED PROPORTIONS (CAN YOU SAY MICROSOFT?). MY ONLY CRITICISM OF THE POLYWELL P-166CX IS THAT IT USES A FEW CHEAP COMPONENTS.

— Michael Brown

PRICE: $2,332
COMPANY: POLYWELL COMPUTERS
PHONE: 800.999.1278
URL: www.polywell.com

boot verdict: 89%

An exciting, powerful alternative to the Pentium

Understanding McLuhan

Deep thoughts on a deep thinker

If you're going to use multimedia to decipher Marshall McLuhan, you'd damn well better get it right. After all, the Canadian theorist built his name on prophesying a world profoundly affected by electronic media; obscuring his message through poor use of technology would be a travesty. Fortunately, Voyager gets it right. *Understanding McLuhan* dives into the vast McLuhan gestalt and comes up with a thorough, well-paced documentary in which the messenger presents his own case.

It's the black-and-white video in the McLuhan On section of the disc that makes this a worthy alternative to any pulp-and-paper version. Watching this fascinating speaker, the granddaddy of modern media, explore what has been bastardized into an academically suspect area of study, you quickly realize the shallow-mindedness of McLuhan's would-be disciples.

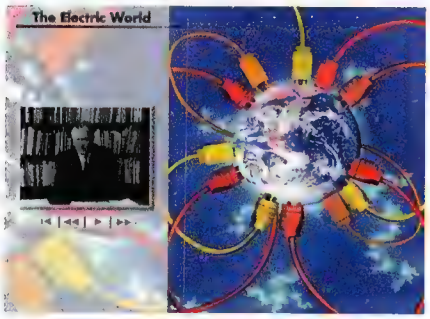
Drawing on archives from the days when television journalists pursued penetrating interviews—not three-second sound bites—McLuhan's eloquent talks make you wonder if the Howard Rheingold's and RU Sirius' of the world are nothing more than opportunistic salesmen, retracing the master's footsteps and repackaging his accomplishments as entertainment.

McLuhan made sense. He spoke without pretense. His arguments were cogent, and his opinions were bold. It's too bad these 15 clips are presented in tiny, 2x2.5-inch windows. You can jump over to the video archive and blow these up in a larger window, but you'll lose a lot of resolution. Voyager has a sophisticated audience; it's time the company recognized this and started taking advantage of faster technology instead of developing for the lowest common denominator.

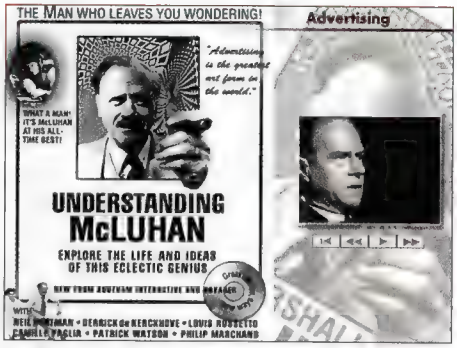
Understanding McLuhan also presents a series of video clips in which contemporary theorists, including Lewis Lapham and Neil Postman, deconstruct McLuhan's impact on media. Other content includes a set of multimedia presentations about McLuhan's core theories; the entire texts of his books *The Gutenberg Galaxy* (published in 1962) and *Understanding Media* (published in 1964); and the audio from a two-hour lecture he delivered in 1978, complemented by a complete transcript.

All of this material is accessed from a quietly sober interface that's easy to navigate, but not at all groundbreaking. If you have any interest whatsoever in Marshall McLuhan, you should check out this disc.

— *Jon Phillips*



Throughout the disc you'll find a mixture of classic video and modern multimedia.


THE MAN WHO LEAVES YOU WONDERING!
Advertising
UNDERSTANDING McLUHAN
EXPLORE THE LIFE AND IDEAS OF THIS ECLECTIC GENIUS

The *Understanding McLuhan* disc is not without a sense of self-parody.

***Understanding McLuhan*'s black-and-white FMV clips hark back to old talk show interviews in which participants smoked cigarettes and spoke for minutes without interruption.**

PRICE: $39.95
COMPANY: VOYAGER
PHONE: 800.446.2001
URL: www.voyagerco.com

boot verdict: 88%

Thorough, thoughtful exploration

The disc's video can also be viewed in a larger window—but you'll lose resolution.

S/W

InventorLabs

A hands-on experience

The best educational software appeals to adults as much as it does to children. Through judicious use of the latest technology, *InventorLabs* takes you on a compelling, immersive trip into the worlds of three famous inventors: Thomas Edison, Alexander Graham Bell, and James Watt.

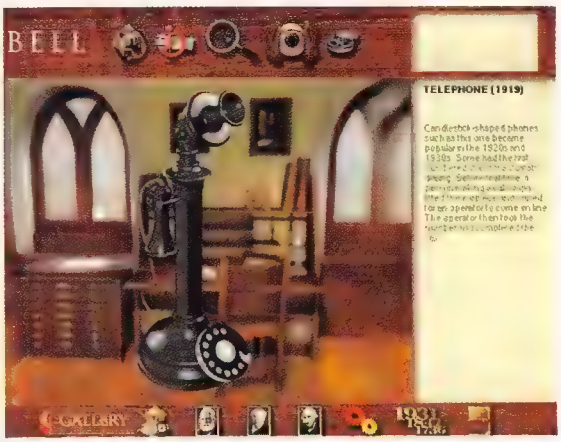
Reproduced inventions, such as Watt's steam engine, can be viewed from various angles and perspectives.

The title opens with video sequences in which actors portraying Edison, Bell, and Watt introduce themselves and discuss the inspiration and research that went into their discoveries. The action then shifts into a virtual-reality mode in which you can explore the labs in which the men worked. Houghton Mifflin went to great lengths to achieve historical accuracy in modelling these labs. Each room was rendered in 3D, mapped with photo-realistic textures for realism, and filled with tools and other objects the inventors would have had at their disposal.

Thanks to QuickTime VR, you can pick up and manipulate nearly all these objects. You can even use the equipment to conduct your own experiments. In Edison's lab, for example, you can "invent" the first incandescent light bulb. In the process, you might discover how little you really know about the science that went into this invention.

And that's the real value of this title. This isn't mind-boggling new technology, it's just technology put to excellent use. Whether you're a college grad or a junior-high-school student, your knowledge of these men and their inventions was probably acquired by rote: Edison invented the light bulb, Bell invented the telephone, Watt invented the steam engine. *InventorLabs* offers an enjoyable means of gaining a deeper understanding—through exploration, experimentation, and discovery—so these topics become more than trivia-game answers.

— Francis Kong



By the 1880's, Bell's telephone had evolved from a novelty to a widely used standard of communication.

PRICE: $39.95
COMPANY: HOUGHTON MIFFLIN INTERACTIVE
PHONE: 800.829.7962
URL: www.hminet.com

boot verdict: 84%

Excellent use of technology

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boot radar

PRODUCT ANNOUNCEMENTS: THEY **TELL** US, WE **PASS** IT ALONG

Be quick, be quicker

The new **BeBox Dual603-133** integrates two RISC-based PowerPC 603e processors running at 133MHz, providing more than twice the performance of the original BeBox (BeBox Dual603-66). The larger integrated cache of the 603e means improved performance, not just an increase in clock speed. Dual603-133's multiple processors enable it to significantly outperform single processor systems that use more expensive, higher clock speed processors. A fully-configured Dual603-133 is priced at $2,995; the non-configured customizable version at $1,995. Be Inc. is accepting orders for the new computer now. **Be Inc.: 415.462-4100; www.be.com**

Play it your way

Coming at you with Sony PlayStation design, the Advance Gravis **GamePad Pro** for $34.95 now gives gamers next-generation console platform control. The GamePad Pro has 10 control buttons for DOS games that support Gravis GrIP and all Win 95 DirectInput games. It is programmable for keyboard-controlled games with a fast digital interface for responsive control, and comes with a detachable joystick handle and built-in two-player connector (standard PC game port connection).

Advance Gravis: 800.257.0061; www.gravis.com/gppro.htm

Infamous Larry

Among the slew of new titles released by Sierra that includes RAMA, Cyber Gladiators, and Hunter Hunted, is the return of the classic Larry Laffer. **Leisure Suit Larry 7: Love For Sail!** sees our hapless hero aboard the world's gaudiest cruise ship run by a gorgeous skipper, Captain Thygh. Imagine a shipload of beautiful women in skimpy swimsuits... imagine the nude pool! Instant movement around the ship means no more "wandering around." **Sierra On-line: 800.757.7707; www.sierra.com**

While you were sleeping...

For $39.95 **Automate 96 v.2.35** will take care of your repetitive tasks: sending and receiving your e-mail, backing-up critical files, virus-checking your hard drive, and performing other routine jobs. Automate is designed to work with all Windows platforms, all Windows and DOS apps, and can work in the background while you're running other programs. There's even a Snooze Alarm. **JE Software: 800.431.1348**

Get active

The **Developing ActiveX Web Controls** book provides developers with a technical introduction to Microsoft's new technology, plus step-by-step instructions about how to create your own Web controls. Available now for $39.99.

The Coriolis Group: 800.410.0192; www.coriolis.com

Out of box experience

Acer now offers the **Aspire** series of desktops for the home power user. The Aspire's memory can be upgraded to a max of 128MB of RAM using industry standard 72-pin SIMMs, 70ns memory; and you can upgrade to 256K L2 cache using industry standard asynchronous SRAM cache. Acer's Aspire uses an FM synthesis 16-bit Sound-Blaster compatible sound card—upgradeable to wavetable using a daughter card. Most models come with a 6x or 8x CD-ROM drive; all models come with a 28.8Kbps or 33.6Kbps fax/modem. The video card is a 64-bit ATI Mach 64 local bus graphics accelerator, upgradeable to 2MB of video memory. The video on the Aspire comes standard with 1MB of industry-standard DRAM and can be upgraded to 2MB. Prices range from $1,199 to $1,999.

Aspire: 800.445.6495; www.acer.com

Taking plug and play to a new level

Brady and Sun Inc. has put together the world's first ready-to-install home office addition. **The Brady CornerOffice** addition comes fully-assembled and prewired for computer, telephone, TV, sound, and electricity. The home office addition installs, in less than a day, a fully-functional office for virtually any home with built-in cherry or oak furniture. Built-to-order, the CornerOffice ranges in price from $16,995 for an 8 by 11 foot model to $23,995 for an 11 by 16 foot version.

Brady and Sun Inc.: 800.882.7239; www.bradyrooms.com

Single-slot, dual-monitor

Available in multiple configurations with up to 40MB of memory, the **Diamond Fire GL 3000** utilizes the high-performance Glint 500TX rendering and Glint Delta geometry engines from 3DLabs to allow for texture mapping in real-time and rendering up to 500,000 Gouraud-shaded polygons per second. A single-slot PCI solution with on-board VGA, the GL 3000 also supports up to two monitors using Diamond's dual-screen technology; up to 1600x1200 res; and refresh rates up to 75Hz simultaneously on both screens. Available now for $2,495 through OEMs, VARs, and distributors with a base configuration of 8MB VRAM/8MB EDO DRAM (upgradeable to 32MB EDO DRAM) for up to 32-bit Z-buffer memory .

Diamond Multimedia: 800.774.4965; www.diamondmm.com

Cost Cutter of Color

Tektronik's new **Phaser 350** retails at $3,495 and offers six pages per minute in fast color mode at about 11 cents a page. To promote the use of the Phaser 350 for both color and black-and-white printing, Tektronik will provide free black ink as a bonus whenever customers order color ink (bringing the cost down to five cents a page).

Tektronik: 800.835.9433; www.tektronik.com

Truly dense

TDK has announced it will offer a super high-density 4mm data cartridge designed for use in DDS-3 drives. Able to store 12GB—three times the capacity of DDS-2 cartridges—the **DC4-125R** data cartridge will be available in the 3rd quarter of 1996 for $35.00 per cartridge. **TDK Electronics: 800.835.8273; www.tdk.com**

Have your Cakewalk and audio too

Cakewalk Pro Audio gives you MIDI and digital audio in one $399 package, providing the complete music workstation for professional musicians, producers, and multimedia developers. Record, edit, and play back as many tracks of digital audio as your computer can handle. Print your compositions as sheet music with lyrics, guitar chord grids, expression text, and dynamic markings. You can use the Cakewalk Techniques, on-screen live-motion tutorials for help in using any of the these features.

Cakewalk: 800.234.1171; www.cakewalk.com

Off we go...

Flying Corps, the latest in a distinguished line of flight sims from Rowan Software, will be available next month for $59.95. Running in SVGA 640x480 with smooth contoured 3D landscapes, Flying Corps recreates the geographical nuances of France during 1917/1918. Dual flight models for each plane cater to both the novice and seasoned flight enthusiast, and you can customize your plane's paint job from a selection of 32,768 options.

Empire Interactive: 800.216.9706; www.empire-us.com

Sci-fi adventure on the XBand

Star Control 3, the highly anticipated sequel to the award winning sci-fi adventure, enters a new galaxy. Players will be able to access XBand sign-up software on the Star Control 3 CD-ROM and play Hyper Melee against other members. The game retails for $59.95 and features intense alien interaction, fast-action space combat, and space exploration.

Accolade: 800.245.7744; www.accolade.com/products/starcontrol3

Internet box

Acorn Computer will ship its **Acorn NetStation** this month. Selling for $618 and using a standard television set to broadcast video, you can surf the Web using a remote-control handset that uses an ARM microprocessor. A slew of other companies, including IBM and Sun River Data Systems, plan to launch Internet boxes throughout the year; Acer and Wyse Technology have already unveiled theirs.

Acorn Computer: www.acorn.co.uk

Time to clean out that system

CyberMedia, the company that brought you First Aid 95, has announced its latest product, **Oil Change**, for keeping PC users up-to-date on the latest fixes and improvements for all their software—via the Internet. The service costs about $50 per year and automatically locates manufacturers' updates on their Web sites, then notifies you when a new update is available. If you decide you'd like the update, Oil Change will download and install it. Oil Change also backs up your existing software before any changes are made so you can easily revert to previous configurations.

CyberMedia: 800.721.7824; www.cybermedia.com/pr/oc.htm

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◀ 29 for better speed. Variable settings for contrast, color depth, and other elements of the video can be changed to further reduce the density of the data. It's a constant trade-off between looks and performance.

Developers such as Origin, Trilobyte, and Sierra have invested time and money to create proprietary compression tools. As the full-screen, full-motion video in *Wing Commander IV* and *The 11th Hour* proves, these tools can be very effective. But they are also very costly to create. *WC IV* cost $10 million to make, and the development of this technology delayed *The 11th Hour* for more than a year.

But small publishers can't afford to develop these custom tools and are instead licensing outside tools to flow compressed data through the CPU, the most prominent being Intel's Indeo, Radius' Cinepak, and RAD's Smacker. Another compressor, Duck's TrueMotion-S, promises to deliver true "video sprites," meaning controllable game characters created from video images. Imagine Duke Nukem video captured from Arnold Schwarzenegger and you have the idea.

SSI used Smacker for the cinematics in games such as *Silent Hunter* and *Necrodome*, while Mindscape used TrueMotion-S for all of *Angel Devoid*. Can you tell the difference between software FMV and true MPEG FMV? Of course you can. The MPEG looks and flows better, but the gap is narrowing as compression techniques become more sophisticated.

The point of all this technology is not to make video flow smoother or appear more like "broadcast quality" television. The point is to make better games. After all these contortions, game makers still must figure out what to do with the video once they have it. Until video becomes as interactive as rendered environments, as TrueMotion promises to do, it will remain a fundamentally passive experience. Only then will it become a welcome part of a true gaming experience. Until then, however, we'll have to just sit back and watch the show.

◀ 67 Other Players

One of the most interesting aspects of the 3D graphics acceleration market is that some of the biggest manufacturers of 2D graphics accelerators are either MIA or only just beginning to announce their plans. Aside from S3, which is enjoying considerable success with its mainstream ViRGE 2D/3D chip, all the players are new.

Take Cirrus Logic, for example. Months after licensing the 3DO Company's M2 technology, the 800-pound gorilla of the video chip market is releasing only cryptic remarks about a new 3D product they have in development. Marketing VP Jim Fontaine did say the new product is unrelated to Cirrus Logic's previously announced M2 project, which now seems to be on the back burner. "You picked the absolute worst time to call," said Fontaine. "We'll have a major announcement soon, but we can't really say anything now."

3D and Intel's AGP

In terms of raw performance, Intel's PCI bus is a dramatic improvement over the old ISA bus, but it still presents a significant bottleneck, particularly to the kind of memory shuffling required for highly textured 3D graphics. Intel's Accelerated Graphics Port is designed to bust through that bottleneck. Although it's designed to complement—not replace—the PCI bus, this new technology will push the Pentium down the slippery slope toward obsolescence: Intel is designing AGP support chips only for the Pentium Pro, the CPU it expects will find a home in mainstream PCs by the 1997 holiday buying season.

Using AGP, a 3D graphics accelerator will be able to store its texture maps, Z-buffering, and alpha-blending data in main system memory, instead of a frame buffer on the card. Don't worry, this isn't the ghost of Unified Memory Architecture back to haunt us. AGP will provide the accelerator with dedicated-pipeline access to system memory at a much faster rate than the PCI bus is capable of, according to Intel.

A number of 3D graphics accelerator designers, including Real 3D and Rendition, have announced their intention to develop products that will take advantage of the AGP. Because it's a new bus architecture, AGP can't be added to existing motherboards. New systems supporting AGP should be available by the middle of next year. — *C.D.*

Microsoft's Talisman

Microsoft presented a series of technical papers at SIGGRAPH '96 in August, including a proposal for a new 3D graphics and multimedia hardware architecture.

Code named Talisman, the project is designed to produce high-quality animation using low-cost components. Microsoft won't manufacture such a chip, but will license the technology to other companies, with board-level products coming to market by the end of 1997.

According to Microsoft documents, the Talisman project will result in "performance rivaling high-end 3D graphics workstations... achieved at a cost point of two to three hundred dollars."

Number Nine Visual Technologies also claims to have something interesting up their sleeve. After dropping plans to produce a Vérité-powered card, they've decided to focus on their proprietary acceleration technology, which will be featured in the Imagine 128 Series 3 card, scheduled for delivery in early 1997.

Move even further out of the mainstream, and you'll encounter the Pyramid 3D chipset from Singapore-based TriTech Microelectronics, and the low cost PIX chip from Seiko-Epson affiliate S-MOS Systems. To date, no third-party manufacturers have announced cards using these chips.

Who will win the battle for 3D supremacy? As long as chip designers and board manufacturers continue to push the envelope, and as long as game producers continue to exploit the new features that result from that push, consumers will be the ultimate beneficiaries. Look to *boot* for ongoing, in-depth coverage of this exciting market. In fact, you'll find hands-on reviews of the newest 3D accelerators from ATI, Matrox, Number Nine, and Orchid on page 78.

— *Chris Dunphy*

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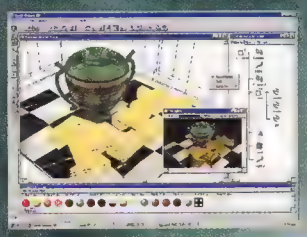

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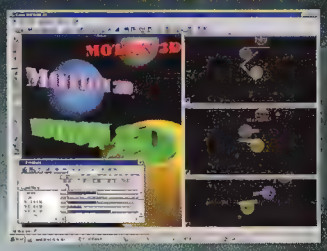

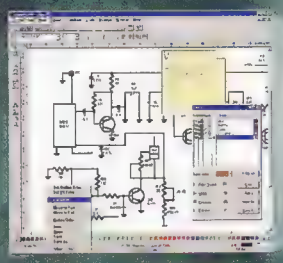

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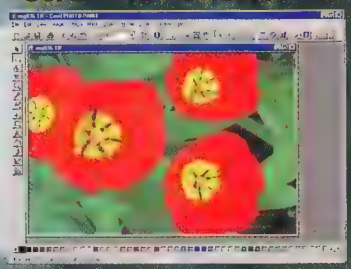

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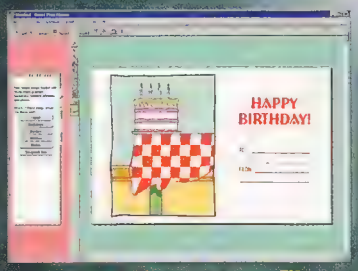

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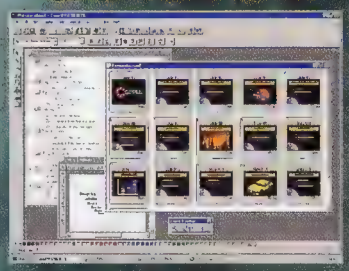

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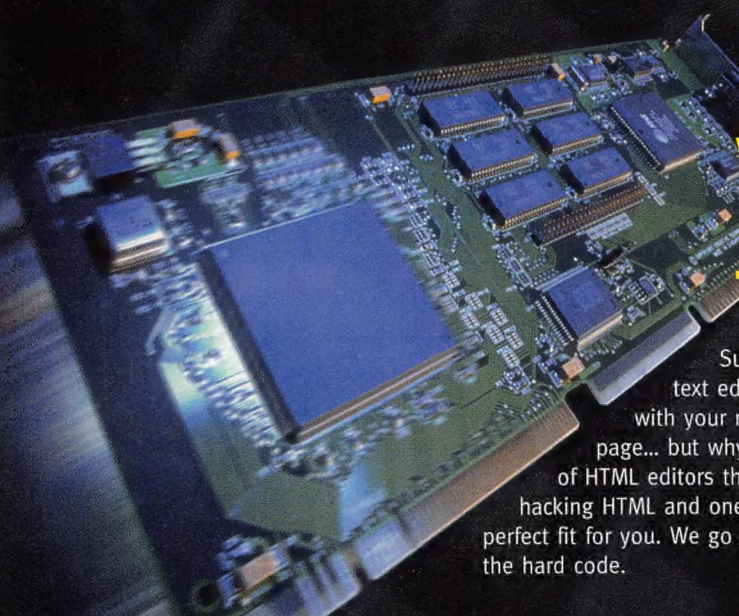

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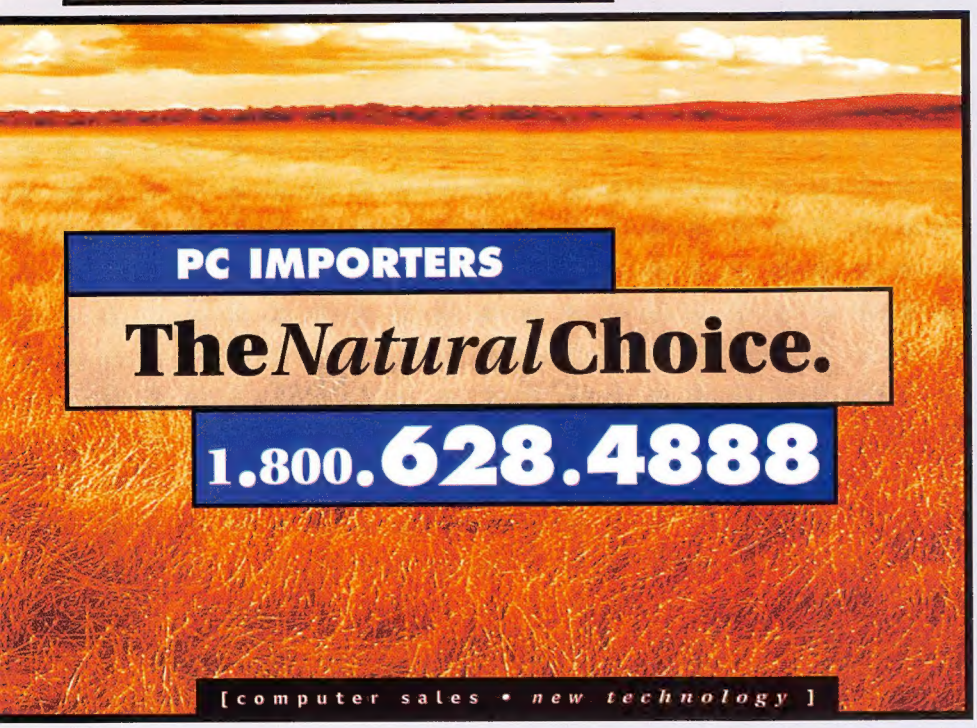

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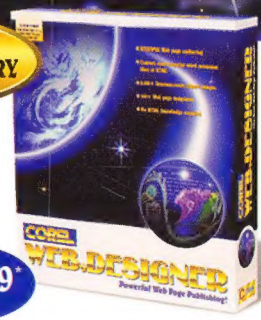

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